THE

PALESTINE EXPLORATION FUND

NOTES AND NEWS.

THE Old and New Testament Maps are now ready. They were issued in November, and there has already been a considerable demand for them. The responsibility of identification rests with Mr. Trelawney Saunders, the editor, to whom must also be given the credit for all the information which he has conveyed with the maps. For instance, the Old Testament Map illustrates the geography not only of the Canonical books, but also that of Josephus and the Apocrypha. The Tribal Divisions, the Twelve Governments of Solomon, the Stations of the Tabernacle and Ark, the Cities of Refuge (Priestly and Levitical), the Canaanite Capitals, Rehoboam's Fortified Places, will be found on the map. By means of different tints, also, the tribes included in the different Captivities are indicated. Mr. Saunders has also added a Key to Ezekiel's Prophetic Divisions. As regards the New Testament Map it illustrates the geography of the Talmud and Josephus as well as of the Gospels. The modern names will be found under the ancient names. The heights are given in English feet. The maps are uniform in size and appearance, and when mounted are 5 feet 4 inches long and 3 feet wide.

The price of these maps is 6*s.* 6*d.* to subscribers, carriage paid to any part of Great Britain or Ireland. This is half the price charged by the publishers to the public. It is found that the water-basins cannot be laid on them, because the maps are already fully occupied with colour used for conveying information. The sections can be had separately in sheets.

The list of identifications of all places in Western Palestine with those adopted by Mr. Saunders and those by Captain Conder is now in preparation, and will be issued as soon as possible.

The third volume of Memoirs has been delayed, but the final revise is now

passing through the press. The other two volumes may be expected in the spring. Captain Conder, who has returned from Egypt, and is now on sick leave, will, as soon as he has recovered his health, return to the service of the Committee, and has undertaken to prepare a paper for the Jerusalem volume, containing an account of all the researches and discoveries made there since Colonel Warren's excavations.

The great work of which these volumes form part will not be reprinted, and only a few copies are left. Particulars of the price may be obtained of the Secretary. The Committee beg their friends to secure them, if possible, for libraries, so as to make them more generally useful.

Colonel Warren is now at Suez engaged in bringing to justice the murderers of Professor Palmer and his companions. Of their fate there is now no longer room for doubt. The notice of Professor Palmer which will be found on page 4 is reprinted from the "Athenæum." A memoir of his life is being prepared by Mr. Walter Besant: it may be expected early in the year. In his most lamentable death, the Society has suffered an irreparable loss. There is no living man who can take his place, because, though many Oriental scholars may be found, there is not one who knows so well the people of the Desert and the Holy Land, their manners, customs, and language.

Work in the field will be resumed as soon as possible. Meantime, Captain Conder will, it is hoped, take up again the work in which he was interrupted, of compiling the Memoirs of the part he has already surveyed. The position of the Society has been greatly improved by the issue of these Memoirs. Its objects are now widely known, and the publication of its splendid maps and the volumes of the Memoirs are at once a proof of the excellence of their past work and a pledge for the future. It is hoped that every subscriber will take a copy of the Biblical maps, if not for his own use, for presentation to schools and libraries.

Mr. Saunders's sections of the country, viz., one from north to south, and four from east to west, have been laid down on two sheets, so that they can be had separately if desired. They are also laid down on his "Water-Basin" Map. The price of the sheets is 1*s*. 6*d*. each. The Jerusalem sheet of the great Map can also be had separately, at half-a-crown.

The income of the Society from all sources, from September 19th to December 22nd was £783 4*s*. 4*d*.

It is suggested to subscribers that the safest and most convenient manner of paying subscriptions is through a Bank. Many subscribers have adopted this

method, which removes the danger of loss or miscarriage, and renders unnecessary the acknowledgment by official receipt and letter.

Subscribers who do not receive the *Quarterly Statement* regularly, are asked to send a note to the Secretary. Great care is taken to forward each number to all who are entitled to receive it, but changes of address and other causes give rise occasionally to omissions.

While desiring to give every publicity to proposed identifications and other theories advanced by officers of the Fund and contributors to the pages of the *Quarterly Statement*, the Committee wish it to be distinctly understood that by publishing them in the *Quarterly Statement* they neither sanction nor adopt them.

EDWARD HENRY PALMER.

(Reprinted, by permission of the proprietors, from the "Athenæum" of November 11th, 1882.)

THE LATE PROFESSOR PALMER.

The intelligence received at the Admiralty from Colonel Warren leaves, unhappily, no room for any further hope. Palmer and his party have been murdered. They were surrounded, captured, taken into the mountains, and then, after two or three days of captivity, they were done to death. For a long time his friends sought comfort in the gleams of hope afforded by possibilities and by conflicting rumours. There was a persistent report that two Englishmen had been killed—where, then, was the third? Alas! the third Englishman was the Sheikh Abdullah, Palmer himself, whom the murderers took for a Syrian effendi. Then it was reported that an Englishman had been seen in the Northern Desert: this Englishman might be Palmer; then it was argued that because Palmer had just gone through the desert alone and unprotected, relying on his knowledge of the people and their language, no harm would happen on a second visit. "It is impossible," said one who had witnessed his power of managing natives, "that any Arab should kill Palmer." There was also the report that he had escaped with the Sheikh Meter Abu Sofieh, and had been carried into Arabia. It is now, however, certain that he is dead; he was not betrayed by any of the Arabs whose friendship he had gained on his first journey, nor was he murdered for the money he had with him, for the murderers knew nothing of it, and the money escaped them. The authors of the crime have to be sought in Cairo, Nakhl, and El Arish. That they will be duly sought and punished we entertain no doubt. The matter has been placed in the best hands; Colonel Warren is no stranger to the wily Oriental. Meantime, the only consolation for this most terrible misfortune is the thought that no soldier ever died more bravely for his country than Palmer; that no more gallant achievement has ever been recorded in history than that first journey of his in which, alone and unprotected, he turned back the tide of fanaticism, and persuaded the countless hordes of the desert to sit down in quiet and become the friends of the Feringhee. A brief record of this journey, drawn up from day to day in letters to his wife, has arrived in England. An official report was drawn up by Palmer for Admiral Seymour, and will, perhaps, some day see the light.

Edward Henry Palmer was born at Cambridge on August 7th, 1840. His parents both died when he was quite young. He was educated at the Perse Grammar School. There was no place for him at Cambridge, while an opening seemed possible in London, probably through family interest. He therefore left Cambridge and came to town, with the view

of entering upon a mercantile career. One knows little of his London life; there can be, indeed, little to tell of a young man's early work in a City house. He learnt, however, French and Italian during these years of City life.

It was in the year 1860 that he determined to give up whatever chances he had in the City of the Golden Pavement, and returned to Cambridge, where after two or three years of study, he entered himself at St. John's, Cambridge. He spent his undergraduate time in reading a great deal of Arabic and Persian, and as little Latin and Greek as possible. A third class in the Classical Tripos marked the extent of his attainments in those languages. Indeed, he never professed at all to be a classical scholar. He took his degree in the year 1867, and it is very greatly to the credit of the Society of St. John's that they recognised his Oriental studies by electing him a Fellow in the same year. This election was, indeed, an endowment of research. The first chance of visiting the East occurred in 1869, when Captain (now Sir Charles) Wilson went out on the Sinai Survey Expedition, accompanied by Captain Palmer, R.E., the Rev. F. W. Holland, and E. H. Palmer. The business of the "pundit" was to investigate the traditions, dialects, and antiquities of the Sinai peninsula. He developed during this journey a wonderful power of quickly apprehending and acquiring dialectic differences, and took his first lessons in the art of managing the difficult tribes of Sinai. Soon after his return in 1870 he made arrangements with the Committee of the Palestine Exploration Fund for a journey of exploration in the very little known Negeb or South Country and the desert of the Tîh. This he accomplished at very small expense in company with the late Mr. C. F. Tyrwhitt Drake, who was assisted by a grant made by the University from the Worts Travelling Bachelors' Fund. His report of the results of the journey was published in the *Quarterly Statement* of the Palestine Exploration Fund, and has been republished in the book of special papers belonging to the "Memoirs of the Survey of Western Palestine." He also wrote a popular account of the same expedition called "The Desert of the Exodus." In the same year, by the resignation of Mr. Theodore Preston, who had long been non-resident, the Lord Almoner's Professorship of Arabic became vacant, and was given by the late Dean of Windsor to Palmer. This preferment, although only worth 40*l.* a year, enabled him to keep his Fellowship and to marry. The stipend of the Professorship was also increased by the University to 300*l.* a year on condition of his giving lectures in Persian and Hindustani. In the year 1874 he was called to the Bar, and although he never seriously considered the law as a profession, it was one of his chief pleasures to go on circuit, to conduct an occasional case, and to study the curious phases of life presented by a county assize. I believe, however, that he showed considerable power in the exercise of advocacy.

Between 1871 and the present year the real work of his life was done. It is wonderful to consider how vast a quantity of work he got through

during these ten years. It must be remembered, too, that the work was accomplished in the face of ill health—he was always suffering from asthma—and domestic affliction caused by the long illness and death of his first wife. A revision of Henry Martyn's translation of the New Testament into Persian; an Arabic grammar; an Arabic manual; a Persian dictionary; a report on the Bedawin of Sinai; a translation into Arabic of Moor's "Paradise and the Peri"; an edition, with an English translation, of the Arab poet Beha ed Din Zohair; a translation of the Koran; a history of Jerusalem; a life of the Caliph Haroun al Raschid; the "Song of the Reed," chiefly from Arabic and Persian sources; a volume of verses in Romany, written with Miss Janet Tuckey and Mr. Charles Leland; and a translation of the Swedish poet Runeberg (with Mr. Erikr Magnusson), make up together a goodly show of work in a short ten years. But besides these books he wrote occasionally for the *British Quarterly Review*—one of his papers on "The Secret Sects of Syria" was a very remarkable article—for the literary journals, for the *Saturday Review*, and for several of the monthly magazines. He translated and transliterated the long lists of names procured by Captain Conder during the survey of Western Palestine, and he was appointed joint editor, with me, of the memoirs of that great work. He was also engaged in preparing a set of manuals and grammars for Messrs. Trübner & Co. at the time when he consented to go out to the desert for the Government. It is impossible for any one to be actively connected with the Palestine Exploration Society without being forced to take an interest in the manifold topographical questions which agitate the minds of the members. Palmer, who took strongly from the beginning a view antagonistic to that of Mr. James Fergusson, contributed for his share of the controversy an account, from the Arab historians' descriptions of the building, of the much disputed Dome. Concerning his linguistic attainments, it is difficult to enumerate the languages which he had acquired, because he was continually learning new ones. Arabic, Persian, Hindustani, Urdu, are some of the Eastern tongues with which he was familiar. He knew Turkish, but not, I think, so well. As regards European languages, he knew French, German, Spanish, Greek, Italian, and Swedish, with its cousins of Denmark, Norway, and Iceland. He knew some Polish and some Russian, but I do not know how far he could be called a master of these languages. He could talk Romany as well as any gipsy on the road. It is a curious fact that he once came across Romany-speaking gipsies in Moab. A striking illustration of his facility and mastery of language occurs to me. We were going together to visit the Foreign Sailors' Home at Limehouse. In the road, just before we arrived at that institution, he espied a friend in charge of a cart filled with baskets—one Stanley or Smith—with whom he exchanged five minutes of question and greeting in Romany. On the steps of the Home were two men basking in the sun: one of these was a Lascar from Calcutta, the other a burly negro who hailed from the Soudan, and talked some kind of Arabic. In the conversation which followed, both men

having a budget of grievances to unfold, it was evidently little or no effort for Palmer to pass from Arabic to Hindustani and back again, turning from one to the other while both talked at once. It is not uncommon to find scholars who have so far mastered languages as to be able to read the literature of many tongues with ease and pleasure, but it is rare indeed to find a man who can speak with equal ease in all or any of the languages he has studied. Palmer was by no means a mere man of books; there was nothing in his ordinary speech, except his extraordinary flow of anecdote, to show that he was a scholar at all. He was a man of small stature, quiet manners, and gentle voice. Yet he was a man who at once impressed every one with whom he came in contact. Perhaps it would not be too much to assert that he had no business or private relations with any man who did not straightway become his friend. Therefore, because he was concerned in many things, he was a man of many friends. It is beyond any power of words to express the loss which those who enjoyed his intimate friendship have suffered by his untimely death.

Another thing: this rare linguist, this extraordinary scholar, possessed to a remarkable degree that power which enables men to become conjurers, thought-readers, so-called spiritualistic mediums. The science of leger-demain had no mysteries for him; he could cheat the senses so that you saw, and steadfastly maintained that you saw, the thing which was not. No doubt the possession of this extraordinary sympathetic faculty stood him in the greatest stead in dealing with the Arabs of the desert. No one else, in fact, could do with these wild people what he could do. He had many methods: he laughed with them or at them; he refused to be moved by their threats; he ordered them; he assumed that they were going to do what he wanted; if necessary he cursed them.

Again, he was an excellent actor: he could "render" a scene with the greatest fidelity and skill, he could multiply himself and personate alone a play with many characters, he could represent to the very life any man he chose to study. And latterly he developed a new power, that of drawing caricature portraits. There exists at his house a portfolio of water-colour drawings in which the features of many friends are depicted with the most good-natured and truthful satire. Another remarkable thing was that although he read very little English literature, and professed to be entirely ignorant of English poetry, he wrote verse with great ease and fluency, both translations and original verse. I hope that when his papers are examined there will be found the materials for giving a glimpse of this side of a many-sided man.

These few words are weak and feeble indeed. Had the man been of lesser power, of lower nature, I could doubtless have spoken more firmly. One wonders whether he ever knew or suspected in the least how great and rare a man he was—how much his friends respected him, and with what bitter hearts they would mourn his loss.

WALTER BESANT.

OBSERVATIONS ON THE CLIMATE OF JERUSALEM.

By Thomas Chaplin, M.D.

Rain.

The following report on the rainfall at Jerusalem embodies the results of a series of observations made during twenty-two years, namely, from 1860–1 to 1881–2.

The instruments employed for measuring the rain have been of two kinds: (1) the old-fashioned float-gauge of Newman, and (2) Glaisher's gauge, as supplied by Negretti & Zambra. The chief disadvantage of the former instrument is that, in consequence of the float displacing by its weight a portion of the water in the cylinder, the reading is usually too low, or no indication at all may be given, when the quantity of rain has been very small. As a collector it has often proved more efficient than the other kind, when heavy rain and hail have fallen accompanied with much wind. The observations have been made with constant regularity at 9 o'clock a.m., except for a short period during the month of March, 1863, and the number of days during which rain fell in that month is not known.

During the first six seasons Newman's gauge was employed; during the remaining seasons Glaisher's. During four seasons the two gauges were placed side by side, and the readings of each carefully noted. The float-gauge showed 88·829 inches during this period, and Glaisher's gauge showed 93·250 inches, and these comparative measurements have been made use of for correcting the readings of the first six seasons, during which the float-gauge alone was employed.[1]

The position of the instruments was in a garden within the city, about 2,500 feet above the level of the Mediterranean, open on all sides, the houses which bound it on the south and west being too far removed to influence the fall of rain into the pluviometers.

Palestine being one of those countries in which a long period of dry weather is regularly followed by one of rainy weather, it will be more practically useful to arrange this report according to seasons than according to years, notwithstanding that each season includes the later months of one year and the early months of the next.

1. The mean duration of each rainy season has been 188 days—the longest being 221 days, the shortest 126 days. The mean duration of each dry season has been 177 days, the longest being 211 days, the shortest 134 days. [Table I.]

2. In ten seasons the rains began between the 4th and 28th of October (inclusive); in twelve seasons between the 1st and 28th of November

[1] For this reason my report of the first five seasons, which was printed in the "Times" of August 16th, 1865, differs slightly from the present.

(inclusive). [Table I.] In four years there has been a slight fall of rain in the month of September, and it is remarkable that on each of these occasions the rainfall of the ensuing season was considerably below the average. [Table II.]

3. In eight years the last rain of the seasons fell between the 2nd and 29th of April (inclusive), and in fourteen years between the 1st and 27th of May (inclusive). A very little rain has sometimes fallen in June. [Table I.]

4. The mean number of days on which rain has fallen in each season has been 52—the highest being 71, the lowest 37. [Table II.]

5. The mean quantity of rain measured in each season has been 22·760 inches—the greatest quantity being 42·932 inches, the smallest 12·269 inches. [Table II.]

6. The mean quantity which has fallen in the several months included in the rainy season, and the mean number of rainy days in each month, are as follows :—

Months.	No. of rainy days.	Inches of rain.
October	1·50	·514
November	5·31	1·664
December	9·04	4·718
January	10·28	5·479
February	10·43	5·207
March	8·51	3·531
April	5·45	1·448
May	1·59	·199
	52·11	22·760

7. During the rainy seasons rain falls on one or more days, and is followed by one or more days of fine weather, and these fine days of the winter and early spring months are some of the most enjoyable that the climate of Palestine affords. The mean number of *rainy periods* in each season has been 23—the highest being 30, the lowest 16. These rainy periods seldom cover more than seven or eight days, and in some entire seasons it has not rained more than five or six consecutive days. Once it rained and snowed for fourteen days (in January, 1861), and once for thirteen days (in February, 1882). Table III has been drawn up to show the number of days in each *rainy period*, and the interval of fine weather which has followed.

8. The rainy season divides itself into three periods. First, that of the early rain, called by the peasants *el wasm el bedry*, "the early sign," which moistens the land and fits it for the reception of the seed, and is consequently the signal for the commencement of ploughing. Second, the copious winter rain, which saturates the earth, fills the cisterns and pools, and replenishes the springs. Third, the latter or spring rain, which causes the ears of corn to enlarge, enables the wheat and barley to support the dry heat of the early summer, and without which the harvest fails.

Between the commencement of the early rain and the setting in of the heavy winter rain a considerable period elapses, and again between the termination of the winter rain and the close of the rainy season by the fall of the last of the spring rains, but these periods are usually broken by the occurrence of rainy days, so that it is often not easy to decide to which period a particular fall of rain should be assigned. Thus in the year 1881 the first rains of autumn fell on November 5th, and were separated by a period of thirty-six days from the heavy winter rains which began on December 18th, but this period was broken by the occurrence of three non-consecutive days on which rain fell; and at the end of the same season the heavy rains terminated on the 15th of April, and the period of thirty-six days which elapsed before the last spring rain fell was broken by the occurrence of four rainy days. The times of the commencement and termination of the heavy winter rains are as uncertain as those of the autumn and spring rains. As a rule, it may be considered that the autumn or early rains extend from the commencement of the rainy season in October or November until the middle of December, the winter rains from the middle of December until the middle or end of March, and the latter or spring rains from the middle of March until the termination of the rainy season in April or May.

9. Although rain may fall when the wind is blowing from any point of the compass, the copious rains are almost invariably brought from a western quarter. Of the 506 falls of rain included in this report, 8 were from the north, 14 from the north-east, 12 from the east, 10 from the south-east, 19 from the south, 238 from the south-west, 156 from the west, and 49 from the north-west. On 149 occasions an easterly wind immemediately preceded the change which ushered in the rain. The direction of the wind frequently alters during the fall; if it passes to the north, the rain ceases; a change from any quarter towards the south-west usually indicates a continuance of rain. [Table IV.]

10. On 248 occasions the fall of rain commenced after a gradual fall of the mercury in the barometer during two or more days, on 144 occasions after a fall during one day, and on 114 after a slight rise. Not unfrequently, after a gradual diminution of the atmospheric pressure, rain begins to fall as the glass begins to rise. During the fall of rain, the mercury rose on 281 occasions, fell on 69, first fell and then rose on 132, and on 24 occasions remained steady until after the rain had ceased. It is during the severe and stormy rainy periods of the winter season that the glass commonly falls and afterwards rises. [Table V, A and B.]

11. It is popularly supposed that the atmosphere becomes warmer as the rain falls. This, however, is not usually the case. The sensation of increased warmth is caused by diminution in the amount of evaporation from the surface of the body when the air becomes saturated with moisture. On 369 occasions the temperature of the air became lower as the rain fell, on 90 it rose slightly, and on 47 remained stationary, or nearly so, until the rain ceased. [Table VI.]

12. In fourteen seasons snow has fallen, and eight seasons have passed

without snow. The last few days of December, the months of January and February, and the earlier part of March, are the periods for snow, but in 1870 there was a heavy fall (1·8 inch) on the 7th and 8th of April, a very remarkable and extraordinary occurrence. For the most part the snow is in small quantity, and soon melts, but very heavy snow-storms sometimes occur, and the snow may then remain unmelted in the hollows on the hill-sides for two or three weeks. The deepest snowfall was on the 28th and 29th of December, 1879, when it measured 17 inches where there was no drift. In February, 1874, it was 8¼ inches deep, and on the 14th of March, 1880, 5 inches. The drifts are sometimes exceedingly deep. [Table VII.]

13. It is remarkable that of twelve earthquakes registered during these twenty-two years, no less than nine have been experienced in the rainy season, namely, one in October, one in December, one in January, two in February, three in March, and one in April ; eight were associated with storm, and four occurred during snow. In Table VIII the readings of the barometer before and after the earthquakes are noted, and the direction of the wind at the time of their occurrence. In nearly every instance they have been preceded or followed by an easterly wind.

14. The overflow of Beer Ayûb, in the Kidron Valley, is regarded by the inhabitants of Jerusalem as an indication that there will be no serious deficiency of water for drinking during the ensuing summer. Careful observations show that the overflow of this well does not depend so much on the quantity of rain which has fallen since the commencement of the season as upon a large quantity falling in a short time. Table IX shows the circumstances under which it has overflowed on every occasion during the period included in this report. On each of the four occasions on which rain has fallen in September there has been no overflow of Beer Ayûb in the following rainy season.

15. A very deficient rainfall is invariably followed by a deficient harvest, but a rainfall much above the average does not necessarily result in a proportionately large harvest. The conditions most favourable to a good yield of wheat and barley are a liberal supply of winter rain, falling on many days, with no prolonged intervals of fine and dry weather, and a copious fall of latter or spring rain. Taking the price of wheat as an indication of the quality of the harvest, we find that after the four years of lowest rainfall, the mean of which was 14 inches, the mean cost of a measure of wheat was 31 piastres ; after the three years of highest rainfall the mean of which was 37 inches, the mean cost of a measure of wheat was 23 piastres ; and after the four years of nearly average rainfall, the mean of which was 23 inches, the mean cost of a measure of wheat was only 18 piastres. When the previous part of the season has been favourable, the harvest may be said to depend entirely upon a sufficiency of the late rains, but a favourable latter rain cannot save the harvest if the corn has previously been extensively shrivelled by a long continuance of easterly winds, nor will the most promising harvest prove satisfactory unless a sufficiency of rain fall at the end of March or during the month of April.

In Table X, the total rainfall, the number of rainy days, and the amount of latter rain, in each season, are placed for comparison in the same column with the price of wheat during the ensuing summer. In using this table it should be remembered that there has been a gradual rise of prices in Palestine during the last twenty years, and that other circumstances besides the rainfall of the season sometimes influence the price of corn.[1]

16. In the Hebrew scriptures, whilst מטר is used as a generic term for rain, גשם appears to signify the pouring winter rain, מורה the early rain, and מלקוש the latter rain. In the well-known passage in Joel (ii, 23), the three are mentioned together, and the connection indicates the necessity of all three for the production of a fruitful harvest: "He will cause to come down upon you the heavy winter rain גשם, the early rain מורה, and the latter rain מלקוש, . . . and the floors shall be full of wheat;" and again in Hosea (vi, 3): "He shall come to us like the heavy winter rain גשם, like the latter rain מלקוש, and the former rain יורה upon the earth"—all that are required to fertilise it, neither being sufficient alone. The beautiful description of spring in the Song of Solomon (ii, 11, *et seq.*) is untrue to nature as rendered in our English translation. The flowers appear on the earth, and the time of the singing of birds comes at least six weeks before the rain is over and gone. It is when the heavy winter rain גשם ceases, and the warm spring weather commences, that the flowers appear, the birds begin to sing, and the voice of the turtle is heard, and it is during this pleasant period that the latter rains fall at intervals. (Cf. Gen. vii, 12, and Ezra x, 13.)

II. Atmospheric Pressure, Temperature, Winds, Clouds, Dew.

Atmospheric Pressure.

1. Jerusalem is 2,500 feet above the level of the Mediterranean Sea, and the mean height of the barometer at 9 a.m. during twenty-one years, corrected for index error and reduced to 32° Fahr., has been 27·398. The highest reading during the period was 27·816, on the 31st December, 1879; the lowest, 26·972, on the 22nd April, 1863, and the 3rd February, 1865, so that the extreme range has been 0·844. The mean annual range has been 0·626. During the eight months in which rain falls, namely, October to May inclusive, the mean height of the mercury has been 27·428; and during the four summer months, when rain very seldom falls, namely, June to September inclusive, 27·331. The months of lowest pressure are July and August, when the mean reading has been 27·290. [Tables XI, XII, XIII.]

[1] War, for instance, and other political disturbances, which cause a larger number of young men than usual to be taken for soldiers. After a very bad harvest, the peasants are too poor to sow largely the ensuing season, and consequently the price of wheat never comes down to the average in one year, however good the crop may be.

2. The mean monthly range has been 0·305. The highest and the lowest readings have occurred in the winter or spring seasons. During the five months from December to April inclusive, the mean monthly range has been 0·423, and during the seven months from May to November inclusive, 0·222. [Table XIII.]

Temperature.

1. To carry on a continuous series of meteorological observations in Jerusalem is extremely difficult, owing to the delays and uncertainties involved in replacing broken or defective instruments, and although great and constant care has been taken to make regular observations, it has several times happened that for a long period one or more of the thermometers has been wanting. The following report on temperature is founded chiefly on observations made through eight successive years, namely, 1864 to 1871 inclusive, with only one short break which does not materially influence the result.[1]

2. The mean temperature during this period was 62·8° Fahr. The coldest month is February, when the mean temperature was 47·9°. It rises month by month until August, when it was 76·1°, and then sinks again month by month until the following February. [Table XIV.]

3. Although the mean temperature is highest in August, the hottest days do not always occur in that month. The highest temperature during these eight years was on the 24th June, 1869, when it reached 103·5°. In May also and September the temperature sometimes rises to 100° or higher. The highest temperature observed during twenty-one years was on the 28th and 30th August, 1881, when it remained for some hours at 112°. The mean temperature during seven days, terminating on August 31st in that year, was 94·4°. [Table XIV.]

4. Although the mean temperature is lowest in February, the minimum of the year does not always occur in that month. The lowest temperature observed during twenty-one years was on the 20th January, 1864, when the minimum thermometer registered 25° Fahr., or 7° of frost. In February and October also, and once in April, a minimum of 32° and 30° has been noted. In Jerusalem frost generally occurs on five or six nights in the course of the winter, but it is rare for ice to remain throughout the day, except in cold situations sheltered from the sun. It will be remembered that the thermometrical observations are made in a garden within the city. It is no doubt often much colder on the hills outside. [Table XIV.]

5. The mean monthly range has been 39·9°. It is greatest in the spring, early summer, and autumn, less in July and August, and least in December, January, and February. From its maximum of 49·8°, in May, it sank to 37·3° and 38° in July and August, rose again to 44·8° in

[1] My warm thanks are due to Mr. Samuel Wiseman and Mr. Joseph el Jemel, of the London Society's Mission to the Jews, for assistance in carrying on the observations.

October, again sank to 31 and 31·6 in December and January, and again rose through February, March, and April to its maximum in May. Thus there are in the course of the year two maxima and two minima of monthly range. [Table XIV.]

6. The mean daily range has been 19·5°. It is greatest in summer from May to October, having during these six months been 23·3°. During the six months from November to April it was 15·7°. The greatest mean daily range was in September, 24·1°; the least in January, 13°. [Table XIV.]

7. The climate of Jerusalem presents at different times the extremes of dryness and moisture. Not unfrequently during the rainy months the dry and wet bulb of the hygrometer stand at the same point, whilst in "sirocco" weather the difference is very great. The mean difference throughout the year at 9 a.m. has been 9·6°; during the six months from November to April, inclusive, 5·8°; and during the six months from May to October, inclusive, 13·1°. But 9 a.m. is not the driest hour of the day. When "sirocco" is prevalent the dry and wet bulb at noon, or a little later, sometimes differ 25 or even 30 or more degrees. On one extraordinary occasion, in August, 1881, there was for a few hours in the middle of the day a difference of 40°, the dry bulb marking 112°, and the wet bulb 72°, and on two or three days the difference was 35° at 9 a.m. [Table XIV.]

Winds.

1. In no country are the health and comfort of the inhabitants and the fruitfulness of the soil more immediately and obviously influenced by the character and direction of the wind than in Palestine. The north wind is *cold*, the south *warm*, the east *dry*, and the west *moist;* and the winds from the intermediate quarters partake of these characteristics in a degree corresponding to their nearness to the cardinal points; the north-east wind is cold and dry, the north-west cold and moist, the south-east hot and dry, and so on.

2. North and north-westerly winds prevail most in the summer months, when they are cool and refreshing, moderately dry, and accompanied by no clouds, or only a few cirri or cumuli. The northerly winds of winter are cold and sharp, and dry or moist according as they come from north-east or north-west. When from the latter quarter they are frequently accompanied by masses of cumulus, which have a very beautiful appearance against the deep blue of the sky. The coolness and sharpness of the north winds, even in the summer season, are much dreaded, especially by the inhabitants of the maritime plain, where they produce sore throats, fevers, and dysenteries. These winds are called *sumâwy*, *i.e.*, heavenly, probably from the clear blue sky which accompanies them. North, north-west, and north-east winds have occurred on 182 days in the year at 9 a.m. [Table XV.]

Whenever during summer there is little wind for several days the heat becomes very great, the mercury in the barometer rises, and the air becomes almost as dry and destitute of ozone as in a *sirocco*, even though what little wind there is blows from a northerly quarter. Ordinarily

this condition is obviated by the springing up of a strong westerly breeze in the afternoon. This breeze is felt as early as 9 or 10 a.m. at Jaffa and other places along the coast, but does not usually reach Jerusalem before 2 or 3 p.m., sometimes not until much later. After sunset it subsides, but soon rises again, and continuing through a great part of the night refreshes the parched land with the abundance of moisture with which it is laden. From a sanitary point of view the value of this evening breeze can hardly be overrated. When it does not blow, or blows very gently, bringing no clouds, and not rising again after the lull which follows sunset, the nights are hot and depressing, there is no dew, and the mornings are wanting in freshness.

One of the most important differences between the climate of the hill district and that of the low western coast of Palestine is in connection with this daily wind from the sea. Although felt nearly every day on the coast, it does not always reach the hills, and hence in very hot weather, when Jerusalem (for instance) is almost insupportable from a severe easterly wind, Jaffa may be comparatively cool and pleasant. In traversing the plain also this wind looses much of its moisture, and it is only after it has been blowing with considerable force for some hours that its refreshing qualities are fully experienced. The struggle for the mastery which sometimes takes place when a current of hot, dry, heavy air from the east meets this moist sea breeze is extremely interesting to witness. Neither being strong enough to overcome the other, the lighter west wind occasionally rises above the eastern current, and clouds may be seen floating towards the east, whilst the lower stratum of air is moving westward, and this may continue some time before a fusion takes place and equilibrium is established (see below). Sometimes a violent disturbance occurs, whirlwinds are produced, clouds and pillars of dust arise, and an hour or more may elapse before the west wind prevails, for it is always the west wind that obtains the victory after these severe contests. At other times the change to a westerly wind is so silent as to pass unnoticed, except in consequence of the change in the quality of the air. The lassitude occasioned by extreme heat suddenly begins to pass away, the spirits revive, exertion again becomes a pleasure, and a glance at the vane shows that a westerly wind is already established. It is very curious, if one happens to be looking out, to see the weathercock suddenly turn round without apparent cause, and almost immediately to feel the refreshing influence of cooler and moister air. The wind has blown direct from the west fifty-five times in a year at 9 a.m. Though most frequent in July and August the west wind is more equally distributed over the several months than any other wind. [Table XV.]

3. Easterly winds are common in autumn, winter, spring, and the month of May. In summer they are rare; on a mean of sixteen years it has blown from an eastern quarter on 101 days in the year at 9 a.m.; from June to September, inclusive, on three days in each month; from October to May, inclusive, on eleven days in each month. [Table XV.] But it is not uncommon during the hot weather for an easterly wind to

blow for three or four hours in the middle of the day, and in the evening to give way to the westerly wind which continues until 10 or 11 o'clock next morning, so that the register made at 9 a.m. does not show all the easterly winds that have occurred.

In winter the east wind is accompanied by a clear blue sky, with perhaps a few cirri. It is dry, stimulating, and, if not too strong, very agreeable. But in the warmer months it is unpleasant and depressing from its great heat and dryness, and the haze and dust which occasionally accompany it. It is when the wind blows from the south-east that it acquires the peculiarities which Europeans usually signify by the term *sirocco*. At such time the sky may be cloudless, or with some cirrus and stratus, the temperature is high, 84° to 90°, or higher, the air destitute of ozone, and extremely dry, the difference between the wet and dry bulb being often as much as 24° or even 28° or 30°. There may be calm, but sometimes the wind amounts to 1 or 1·5, and veers between east, south-east, and south. The more the wind tends to the south, the more dull and overcast is the sky, and the more disagreeable to the feelings the state of the atmosphere; the more it tends to the east, the clearer is the sky and the stronger and fresher the breeze. The worst kind of *sirocco* dries the mucous membrane of the air passages, producing a kind of inflammation resulting in catarrh and sore throat; it induces great lassitude, incapacitating for mental as well as bodily exertion, in those who walk or work in it; headache, with a sense of constriction as if a cord were tied round the temples, oppression of the chest, burning of the palms of the hands and soles of the feet, accelerated pulse, thirst, and sometimes actual fever. It dries and cracks furniture, loosening the joints of tables and chairs, curls the covers of books and pictures hung in frames, parches vegetation, sometimes withering whole fields of young corn. Its force is not usually great, but sometimes severe storms of wind and fine dust are experienced, the hot air burning like a blast from an oven, and the sand cutting the face of the traveller who has the misfortune to encounter it. This kind of air has a peculiar smell, not unlike that of the neighbourhood of a burning brick-kiln. Sometimes the most remarkable whirlwinds are produced, especially in the western plain near the hills, by the meeting of a strong east or south-east wind with a wind from the west or north. Clouds of sand fly about in all directions, now taking the traveller in front, now behind, and now on the side, and the gusts of wind are so violent as to blow weak persons from their horses, and to overturn baggage animals. The cold *sirocco* of winter often blows with much force, and when it comes from a few degrees north of east, it is so cold and piercing as sometimes to kill those who are exposed to it without sufficient clothing, instances of which occurred in 1867.

A great number of observations have been made with a view of determining the amount of ozone in the atmosphere in different states of the weather, and these repeated experiments have shown that none is to be detected during the prevalence of the *sirocco* wind. It was thought the extreme dryness of the air might prevent the chemical reaction, but the

result was the same when the paper was kept moistened. The west, north-west, and especially the south-west currents of air are those most richly charged with ozone.

The following is a note of a summer *sirocco* written at the time of its occurrence:—"At 9 a.m. on August 24th, 1877, a brisk wind was blowing direct from the east, there was considerable haze and dust, and high up towards the north-east some cirro-cumulus. In the course of the morning cumulus increased, and became mingled with the haze. At sunset it was 3. The dry bulb at 9 a.m. was 96°, wet bulb 63°; at 11 a.m., dry bulb 102°, wet bulb 66°; at noon, dry bulb 103·3°, wet bulb 66·5°. About 5 p.m. a rainbow was observed, and a few drops of rain were said to have fallen a little west of the city. During this remarkable day a very dry, and consequently heavy, stratum of heated air was driven with considerable force from the east, and was met (probably in the western plain) by a moist current from the sea; they did not immediately mingle, but the light moist air passed onwards towards the east over the heavy stratum of hot dry air, the velocity of both being impeded. The wind below continued east all day, sinking gradually from a force of 0·5 to 0·2, and eventually to 0·0, and in the evening a light soft breeze sprang up from west-south-west which passed round to west soon after sunset. The next morning the two strata of air had commingled, the sky was clear, excepting some haze in the horizon, temperature very high, 97·5° at 9 a.m., rising to 107° at noon, and the difference between the wet and dry bulb had gone down to 34°. At noon the wind, which until then had been north-east, passed by way of north to west." The termination of a late autumn *sirocco* is different. "November 4th, 1868. After *sirocco* had prevailed for more than thirty days, the wind suddenly changed on October 30th, by way of south to west, a breeze sprang up bringing cumuli and loose masses of nimbus; much dew was deposited during the night, and there were a few drops of rain. Two gusty cloudy days followed, the atmosphere becoming more and more hazy from fine dust, and on the evening of November 2nd a heavy, long-continued shower of rain fell, preceded by thunder. The next day there was more rain, and by the morning of the 5th upwards of an inch had been measured. During the days preceding the rain the barometer and thermometer both fell—the former gradually, the latter more suddenly. At 9 a.m. on October 30th the temperature was 88°, at 9 a.m. on the 31st 66°, and on the 3rd November it had fallen to 53°, a difference of 35° in four days."

It is an old and common saying that a *sirocco* always lasts three days, but like many other popular sayings this is only partially true. A *sirocco* may last three days, or it may last twenty or even thirty days. Thus in 1868 there was *sirocco* almost every day from 28th September until the weather began to break up for rain on October 30th. During the continuance of *sirocco* there is frequently a partial change in consequence of the sea-breeze of the afternoon reaching the hills, and the vane is often found pointing to north or north-west at 9 a.m. It occasionally happens that the air has all the qualities of a bad *sirocco* when the wind is blowing from a

northerly or westerly quarter. No doubt the *sirocco* storms are often of the nature of cyclones, and these instances are probably sometimes due to the returning current of a wind which originally proceeded from some point between south and east. But the peculiarities of this wind, its heat, its dryness, and its deficiency in ozone, are probably of telluric origin; and it appears that whenever a very high temperature prevails for some days without wind, the quality of the air in contact with the surface of the earth becomes modified, and a wind springing up from any quarter may then have for a time the properties of the true *sirocco* —the *simoom*, or poisonous wind, which usually comes from the interior of Arabia.

4. The mean force of the wind at 9 a.m. has been 0·46 on a mean of ten years. It is greatest in February, March, and April, in which the mean has been 0·65, and least in August, September, and October, when the mean has been 0·30. During the winter months the force of the wind sometimes amounts to 3·5 or 4, on a scale of 0—6, but it is very seldom that damage of a serious nature is done to trees or buildings. The mean number of days on which there was calm at 9 a.m. has been 108 in a year, the greatest number being in the five months from September to January inclusive, when the mean in each month was eleven days. As in all mountain districts, absolute calm is rare for any length of time, and a very delicate instrument might perhaps have detected some movement of the air on many of the days entered as calm. [Table XVI.]

Clouds.

1. As in other warm countries, clouds are in Palestine a very important element of the climate. Their presence is beneficial in three ways—they are at once a cause and a sign of moisture in the air; by intercepting the rays of the sun they produce shade which moderates the heat; and by the evaporation of the water of which they are composed the temperature of the atmosphere is lowered. The mean annual amount of cloud at 9 a.m. on a mean of sixteen years has been 2·8. The amount is smallest in July and August (0·6 and 0·9); it rises gradually through the autumn to its maximum in the winter months, and then falls again gradually to its minimum in July. On the same mean, 140 days in the year have been cloudless at 9 a.m., the maximum number being in July (21·5), and the minimum in February and March (5·1 and 5·5). [Table XVII.]

Dew.

1. During the fine weather of the winter months dew falls in Palestine from the same causes and under the same circumstances as in Europe, the moisture contained in the atmosphere being deposited when the night is favourable to the radiation of heat from the surface of the earth. But in the summer months, when the whole country is arid, and there is no water to evaporate, the copious dews are brought entirely by the westerly winds from the sea. If no westerly breeze, or a very light one, springs up

towards evening, there is no dew. The heavy dews of summer which modify the climate so remarkably differ from ordinary dew in the manner of their deposition, *being in great part precipitated in the air in the form of mist before being deposited on the earth.*[1] On summer evenings a few clouds are commonly to be seen in the western horizon soon after sunset. Later in the evening they increase in number, become lower and looser, and sweep past at no great elevation, and often with considerable velocity. After midnight, or earlier, they become still more abundant and still lower, brushing the tops of the hills as they pass, and depositing much of their moisture upon them. Although dew may fall, even in summer, in the usual way on clear nights, the surest sign of a copious deposition is the appearance of clouds with a westerly wind after sunset. Frequently there is a visible moisture in the atmosphere, which yet does not amount to mist or cloud, but produces only a haziness in the horizon, which is indicative of a damp night. Dew is most copious in spring, and in September and October, except during *sirocco* weather, when there is none. It may be noted that clouds and a westerly wind at sunset and afterwards are not always indications of a very damp night. The dew deposited as a result of this condition early in the evening may, if the wind should fall or change to east, entirely evaporate before morning. It is the continuance of the westerly wind through the night that brings abundance of dew. During the prevalence of *sirocco*, and especially when *sirocco* is just commencing or terminating, the sky is sometimes obscured at night by masses of cirro-cumulus and some stratus intermixed, and when this is the case there is usually no dew. But should a wind spring up from the west, and bring cumulus and mist from the sea, a deposit of dew takes place.

After a very dewy night the sky at daybreak is obscured—and often houses, trees, &c., also—by a thick mist, the ground, plants, stones, and especially tents, being wet as if rain had fallen. As the sun rises the mist begins to clear, and large masses of loose flocculent clouds are formed, between which the bright blue sky is here and there visible. These masses of cloud become smaller and denser as the heat increases, forming beautiful cumuli, which in their turn disappear and give place to the dull blue sky usual in summer. The time at which these morning clouds entirely disappear depends on their amount and the heat of the weather. Frequently the sky is quite clear by 9 o'clock, and it is rare for more than one or two masses of cumulus to remain later than 10 or 11 o'clock, but during the day, when the wind is not easterly, a little light cloud may sometimes be seen to form in the sky, and after growing for a time gradually but quickly disappear, to be soon followed by another. This "one cloud" often attracts the attention of the traveller, and becomes an object of

[1] "Aristotle supposed dew to be a species of rain, formed in the lower atmosphere in consequence of the moisture which had been carried up during the day by evaporation being condensed by the cold of the night into minute drops."—"Penny Cyclop." Art. DEW.

interest to him as he goes on his way, and not improbably it suggested to St. James that beautiful simile of human life, "What is your life? It is even a vapour (ἀτμὶσ) that appeareth for a little time and then vanisheth away."

NOTE.

The unhealthy period of the year, the period in which the climatic diseases of the country, such as ophthalmia, fevers, and dysentery, are most prevalent, extends from May to October inclusive. Six things strongly characterise this period. 1. Almost entire absence of rain; 2. Low atmospheric pressure with small range; 3. High temperature with great daily range; 4. Great dryness of the atmosphere; 5. A very small amount of cloud; and 6. Except at the beginning and end of the period, a minimum of easterly winds.

TABLE I.—Showing date of commencement and termination of rains, and the duration of the rainy and dry seasons.

Seasons.	Date of		Duration of	
	Commencement.	Termination.	Rainy Season.	Following Dry Season.
			days	days
1860–1	November 12th	May 25th	195	172
1861–2	November 14th	April 29th	167	185
1862–3	November 1st	April 28th	179	167
1863–4	October 13th	April 26th	197	197
1864–5	November 10th	May 9th	181	175
1865–6	November 1st	April 21st	172	165
1866–7	October 4th	May 12th	221	181
1867–8	November 10th	May 27th	200	158
1868–9	November 2nd	May 7th	187	191
1869–70	November 15th	April 22nd	159	173
1870–1	October 13th	May 2nd	202	173
1871–2	October 23rd	May 24th	215	134
1872–3	October 6th	May 3rd	210	173
1873–4	October 24th	April 5th	164	211
1874–5	November 3rd	May 1st	180	195
1875–6	November 13th	May 16th	186	145
1876–7	October 9th	April 28th	202	174
1877–8	October 20th	May 7th	200	204
1878–9	November 28th	April 2nd	126	208
1879–80	October 28th	May 2nd	188	167
1880–1	October 17th	May 21st	217	167
1881–2	November 5th	May 23rd	200	..
		Means ..	188·5	176·9

TABLE II.—Showing the number of days on which rain fell, and the amount of rain in each month during 22 rainy seasons, from 1860–1 to 1881–2.

Seasons.	1860–1		1861–2		1862–3		1863–4	
Months.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
September ..	..	..	..	..	..	..	..	..
October ..	..	..	..	..	..	..	7	1·900
November ..	2	·105	3	·184	9	2·957	1	·190
December ..	7	2·191	13	7·763	7	2·587	12	7·125
January ..	14	9·663	14	12·409	10	9·109	8	6·890
February ..	7	6·495	7	2·270	7	2·402	5	1·503
March	5	2·402	3	·633	?	3·695	4	1·082
April	1	·316	4	1·003	7	2·112	6	1·648
May	4	·475	..	..	..	..	..	
Totals ..	40	21·647	44	24·262		22·862	43	20·338

Seasons.	1864–5		1865–6		1866–7		1867–8	
Months.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
September ..	2	·091	..	..	..	..	..	..
October ..	..	..	..	..	5	1·745	..	..
November ..	4	2·645	11	1·560	8	1·835	4	2·240
December ..	7	1·648	11	5·450	13	2·970	10	6·975
January ..	7	4·541	14	5·055	11	9·245	9	3·565
February ..	8	5·084	9	3·175	12	6·067	18	10·925
March	5	·422	9	3·460	8	2·135	7	3·285
April	3	·765	4	·290	3	2·010	13	1·928
May	3	·370	..	..	5	·730	1	·140
Totals ..	37	15·475	58	18·990	65	26·737	62	29·058

Seasons.	1868–9		1869–70		1870–1		1871–2	
Months.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
September ..	..	..	1	·270	..	..	..	..
October ..	..	..	..	..	4	2·290	2	1·580
November ..	7	1·186	6	1·470	1	·010	1	·100
December ..	13	8·047	5	1·165	4	1·450	13	6·489
January ..	15	7·715	9	1·235	9	2·943	6	3·105
February ..	12	3·265	1	·690	11	4·415	17	5·249
March	4	1·945	9	3·990	16	6·747	7	1·430
April	8	2·363	13	3·719	3	1·100	4	·420
May	2	·395	..	..	1	·190	3	·108
Totals ..	61	24·916	43	12·269	49	19·145	53	18·481

Seasons.	1872–3		1873–4		1874–5		1875–6	
Months.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
September ..	..	..	..	..	..	..	1	·030
October ..	4	·310	1	·010	..	..	..	..
November ..	7	3·390	7	4·410	6	2·510	6	1·120
December ..	7	6·235	13	9·300	6	1·435	9	3·190
January ..	4	·130	15	8·430	14	6·790	7	3·420
February ..	10	6·032	12	7·215	12	4·085	10	4·140
March	11	1·935	20	10·017	14	10·520	7	2·270
April	2	·890	3	·130	4	1·040	8	1·965
May	1	·010	..	..	1	·230	4	350
Totals ..	46	18·942	71	39·512	57	26·610	51	16·455

Seasons.	1876–7		1877–8		1878–9		1879–80	
Months.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
September ..	..	..	..	..	2	·790	..	..
October ..	1	·080	5	2·180	..	..	3	·815
November ..	7	1·690	11	5·015	1	·025	5	·685
December ..	3	·490	13	7·345	4	3·000	6	4·235
January ..	9	1·595	14	13·390	6	·980	15	5·995
February ..	13	8·750	13	11·490	6	2·265	12	4·035
March	5	·885	7	2·350	17	7·520	7	5·635
April	3	·210	2	·510	3	1·520	6	2·065
May	..	..	3	·652	..	..	1	·100
Totals ..	41	13·700	68	42·932	37	15·310	55	23·565

Seasons.	1880–1		1881–2		Mean of 22 seasons.	
Months.	Days.	Inches.	Days.	Inches.	Days.	Inches.
September ..	..	..	..	..	..	..
October ..	1	·400	..	..	1·50	·514
November ..	5	·860	5	2·430	5·31	1·664
December ..	15	12·995	8	1·720	9·04	4·718
January ..	3	1·275	11	3·075	10·28	5·479
February ..	12	4·430	16	12·590	10·43	5·207
March	10	4·355	4	·970	8·51	3·531
April	8	2·205	12	3·650	5·45	1·448
May	2	·065	4	·570	1·59	·199
Totals ..	56	26·585	60	25·005	52·11*	22·760

* 21 seasons.

TABLE III.—Showing the number of days in each rainy period, and the interval of fine weather following.

	1860-1		1861-2		1862-3		1863-4	
——	Days of		Days of		Days of		Days of	
	rain.	interval.	rain.	interval.	rain.	interval.	rain.	interval.
	1	6	1	7	1	15	1	2
	1	11	1	7	4	1	2	9
	1	3	1	7	2	2	3	1
	2	9	1	1	1	3	1	9
	1	2	6	1	1	4	1	22
	1	1	1	3	1	4	1	7
	1	1	1	2	1	2	7	9
	1	22	1	4	1	2	2	1
	3	3	2	1	1	11	2	6
	14	4	5	4	3	5	4	4
	2	7	5	7	1	10	3	7
	1	3	4	5	1	5	1	12
	1	16	1	2	6	2	1	3
	1	12	1	1	4	2	1	2
	1	2	1	10	1	5	1	2
	3	22	2	5	1	1	2	13
	1	19	3	12	1	8	3	21
	1	1	2	17	(?)2	?	1	16
	2	11	1	20	1	3	1	1
	1	..	2	7	1	9	1	4
	..	..	2	..	3	1	1	3
	..	..	..	..	2	..	3	..
	..	..	..	..	..	..	..	..
	..	..	..	..	..	..	..	..
Rainy periods..	20	..	21	..	22	..	22	..
Rainy days ..	40	..	44	..	..	..	43	..
Dry days ..	155	..	123	..	..	..	154	..
Duration of rainy season } days	195	..	167	..	179	..	197	..

TABLE III—*continued.*

——	1864–5		1865–6		1866–7		1867–8	
	Days of		Days of		Days of		Days of	
	rain.	interval.	rain.	interval.	rain.	interval.	rain.	interval.
	1	11	3	10	1	15	1	1
	1	2	2	4	3	1	3	19
	2	9	4	1	1	7	2	7
	2	3	2	12	3	7	2	1
	3	1	3	11	2	4	3	9
	1	8	8	6	2	5	3	13
	1	14	7	2	1	9	4	1
	1	2	2	3	4	4	2	3
	3	11	2	1	3	8	2	6
	3	6	1	2	3	2	1	1
	2	9	1	4	1	1	3	3
	1	5	2	6	3	4	1	3
	3	1	2	1	6	13	6	2
	1	2	1	6	3	3	8	7
	1	2	2	6	2	3	2	1
	1	3	5	6	2	3	3	13
	1	1	1	2	1	1	2	5
	1	8	1	3	2	8	5	3
	1	8	4	9	6	10	3	8
	1	16	1	4	2	2	2	1
	1	1	2	15	2	8	3	31
	2	18	2	..	3	2	1	..
	2	3	..	..	1	8	..	..
	1	..	..	..	3	28	..	..
	..	..	..	..	5	..	..	..
Rainy periods ..	24	..	22	..	25	..	22	..
Rainy days ..	37	..	58	..	65	..	62	..
Dry days ..	141	..	114	..	156	..	138	..
Duration of rainy season } days	181	..	172	..	221	..	200	..

TABLE III – *continued.*

	1868–9		1869–70		1870–1		1871–2	
	Days of		Days of		Days of		Days of	
	rain.	interval.	rain.	interval.	rain.	interval.	rain.	interval.
	2	1	1	3	1	7	2	28
	2	9	4	6	1	5	1	7
	1	3	1	1	2	2	2	9
	1	4	1	7	1	42	5	1
	1	6	2	9	1	3	1	1
	4	3	2	16	3	16	2	1
	1	2	2	3	3	1	2	5
	4	1	1	8	1	6	1	5
	2	6	1	1	3	10	2	10
	2	12	2	1	4	3	2	4
	2	3	1	1	1	9	2	7
	4	1	1	2	1	1	4	1
	4	2	1	8	4	2	5	3
	1	1	1	22	3	3	3	4
	1	1	3	11	11	1	5	6
	3	1	2	2	3	9	1	14
	1	4	4	8	2	8	4	8
	2	1	2	2	1	9	4	7
	5	4	5	4	2	16	1	5
	1	7	2	1	1	..	1	17
	4	13	4	..	..	..	1	7
	1	5	..	..	..	..	1	12
	2	13	..	..	..	..	1	..
	2	3	..	..	..	..	..	..
	3	3	..	..	..	..	..	..
	2	10	..	..	..	..	..	..
	1	2	..	..	..	..	..	..
	1	5	..	..	..	..	..	..
	1	..	..	..	..	..	..	..
Rainy periods..	29	..	21	..	20	..	23	..
Rainy days ..	61	..	43	..	49	..	53	..
Dry days ..	126	..	116	..	153	..	162	..
Duration of rainy season } days	187	..	159	..	202	..	215	..

TABLE III—*continued.*

	1872–3		1873–4		1874–5		1875–6	
——	Days of		Days of		Days of		Days of	
	rain.	interval.	rain.	interval.	rain.	interval.	rain.	interval.
	1	14	1	19	2	5	3	5
	3	14	1	5	1	6	1	2
	2	1	3	2	1	1	1	4
	5	26	3	15	1	7	1	5
	1	12	6	1	1	2	1	4
	6	14	3	4	1	7	1	2
	1	7	4	2	2	2	4	3
	2	6	4	5	1	13	1	2
	1	2	3	2	2	6	1	5
	1	6	2	6	1	1	1	2
	2	6	2	1	2	1	2	9
	1	1	3	1	5	8	1	5
	3	1	2	1	2	1	3	2
	2	3	1	2	2	3	1	10
	1	7	1	2	3	2	4	2
	3	4	1	1	3	5	3	5
	3	1	1	1	1	2	2	7
	3	6	3	2	4	3	1	4
	1	3	1	4	3	4	1	1
	2	16	1	3	1	1	3	2
	1	14	5	2	2	1	2	5
	1	..	5	5	6	6	1	14
	..	..	4	1	1	7	2	3
	..	..	1	1	4	4	4	3
	..	..	7	4	2	4	2	22
	..	..	2	1	2	21	1	7
	..	..	1	..	1	..	3	..
Rainy periods..	22	..	27	..	27	..	27	..
Rainy days ..	46	..	71	..	57	..	51	..
Dry days ..	164	..	93	..	123	..	135	..
Duration of rainy season } days	210	..	164	..	180	..	186	..

TABLE III—*continued.*

——	1876–7		1877–8		1878-9		1879–80	
	Days of		Days of		Days of		Days of	
	rain.	interval.	rain.	interval.	rain.	interval.	rain.	interval.
	1	28	1	2	1	1	5	4
	1	6	3	1	1	22	1	11
	4	8	1	7	1	1	1	7
	2	20	1	3	2	20	1	15
	1	1	1	1	1	4	1	6
	1	8	3	10	3	3	1	4
	1	1	3	1	2	4	1	2
	2	8	3	8	1	6	3	3
	3	6	2	1	2	3	8	2
	1	5	3	8	2	3	1	3
	3	3	5	1	1	11	2	1
	1	3	2	1	3	1	1	2
	7	4	3	4	9	3	3	15
	4	8	2	7	3	3	5	2
	1	2	4	2	1	4	4	1
	2	10	3	1	4	..	2	3
	1	1	1	3	..	..	1	11
	1	13	2	4	..	..	7	21
	1	2	4	2	..	..	1	6
	1	20	2	2	..	..	3	9
	1	4	4	2	..	..	2	5
	1	..	2	1	..	..	1	..
	..	..	1	4	..	..	..	..
	..	..	2	4	..	..	..	..
	..	..	1	14	..	..	..	..
	..	..	2	4	..	..	..	..
	..	..	2	18	..	..	..	..
	..	..	2	12	..	..	..	..
	..	..	2	4	..	..	..	..
	..	..	1	..	..	..	..	..
Rainy periods..	22	..	30	..	16	..	22	..
Rainy days ..	41	..	68	..	37	..	55	..
Dry days ..	161	..	132	..	89	..	133	..
Duration of rainy season } days	202	..	200	..	126	..	188	..

TABLE III—*continued.*

	1880-1		1881-2	
——	Days of		Days of	
	rain.	interval.	rain.	interval.
	1	31	3	12
	1	5	1	6
	1	3	1	6
	5	3	1	12
	5	2	5	6
	1	9	1	1
	1	1	1	3
	3	1	1	9
	3	13	10	8
	2	10	13	11
	1	9	3	17
	2	3	2	5
	4	3	1	3
	2	3	1	3
	4	6	6	6
	4	5	4	7
	1	4	2	6
	3	4	1	1
	2	17	1	18
	8	21	2	..
	1	8	..	..
	1	..	..	..
Rainy periods..	22	..	20	..
Rainy days ..	56	..	60	..
Dry days ..	161	..	140	..
Duration of rainy season } days	217	..	200	..

TABLE IV.—Showing connection of rain with direction of wind.

Seasons.	Number of rainy periods.	Direction of wind during rainfall								Easterly wind preceding.
		N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	
1860–1	20	..	1	..	..	..	2	16	1	7
1861–2	21	..	1	1	..	1	7	11	..	6
1862–3	22	1	..	2	..	2	7	10	..	8
1863–4	22	..	1	2	..	..	10	9	..	7
1864–5	24	1	1	..	1	2	10	5	4	7
1865–6	22	..	2	..	1	1	11	2	5	12
1866–7	25	..	1	..	..	3	18	3	..	10
1867–8	22	1	..	..	..	..	14	7	..	5
1868–9	29	..	..	1	1	1	17	5	4	5
1869–70	21	..	1	..	..	..	10	6	4	8
1870–1	20	..	..	..	..	..	15	3	2	6
1871–2	23	..	1	1	..	..	13	7	1	5
1872–3	22	..	..	1	..	1	7	8	5	4
1873–4	27	1	1	..	1	1	9	12	2	5
1874–5	27	3	..	1	..	1	11	9	2	9
1875-6	27	..	..	1	2	3	13	5	3	7
1876–7	22	..	..	..	1	..	10	11	..	5
1877–8	30	..	2	1	..	1	13	9	4	9
1878–9	16	1	1	..	..	1	7	1	5	3
1879-80	22	..	..	..	1	1	13	3	4	7
1880–1	22	..	1	1	1	..	11	7	1	8
1881–2	20	..	..	..	1	..	10	7	2	6
Totals ..	506	8	14	12	10	19	238	156	49	149

TABLE V.—Showing connection of rainfall with barometric changes.

Seasons.	Number of rainy periods.	A Rain began after			B During the rain the mercury			
		Gradual fall of mercury.	Fall of one day only.	Slight rise	Rose.	Fell.	First fell then rose.	Remained steady.
1860–1	20	11	2	7	9	4	3	4
1861–2	21	9	8	4	6	8	6	1
1862–3	22	5	11	6	12	4	4	2
1863–4	22	14	2	6	12	4	5	1
1864–5	24	11	5	8	13	5	4	2
1865–6	22	4	14	4	8	3	8	3
1866–7	25	8	12	5	12	1	12	..
1867–8	22	9	10	3	6	6	9	1
1868–9	29	13	8	8	14	4	9	2
1869–70	21	12	6	3	15	2	4	..
1870–1	20	11	7	2	14	2	4	..
1871–2	23	15	3	5	18	1	4	..
1872 3	22	10	3	9	17	1	3	1
1873–4	27	13	7	7	7	6	13	1
1874–5	27	12	11	4	17	3	6	1
1875–6	27	14	8	5	17	2	5	3
1876–7	22	15	4	3	15	2	4	1
1877–8	30	10	10	10	16	3	10	1
1878–9	16	8	4	4	13	1	2	..
1879–80	22	13	4	5	13	3	6	..
1880–1	22	15	4	3	16	1	5	..
1881–2	20	16	1	3	11	3	6	..
Totals.	506	248	144	114	281	69	132	24

TABLE VI.—Showing connection of rainfall with temperature.

Seasons.	Number of rainy periods.	With the fall of rain the temperature		
		Fell.	Rose.	Remained unchanged.
1860–1	20	13	6	1
1861–2	21	16	4	1
1862–3	22	11	9	2
1863–4	22	13	8	1
1864–5	24	18	1	5
1865–6	22	15	3	4
1866–7	25	20	2	3
1867–8	22	14	4	4
1868–9	29	21	5	3
1869–70	21	16	2	3
1870–1	20	14	4	2
1871–2	23	16	5	2
1872–3	22	16	4	2
1873–4	27	21	4	2
1874–5	27	23	1	3
1875–6	27	21	5	1
1876–7	22	18	4	..
1877–8	30	22	6	2
1878–9	16	12	1	3
1879–80	22	17	5	..
1880–1	22	17	4	1
1881–2	20	15	3	2
Totals	506	369	90	47

TABLE VII.—Snow.

Seasons.	
1860–1	January 5th and 11th ; February 1st and 2nd, deep.
1861–2	None.
1862–3	January 24th, February 22nd, 1 inch.
1863–4	None.
1864–5	None.
1865–6	None.
1866–7	None.
1867–8	February 14th, 16th, 21st, 22nd, 26th and 27th.
1868–9	None.
1869–70	April 7th and 8th, 1·8 inch.
1870–1	February 19th.
1871–2	None.
1872–3	February 18th.
1873–4	December 26th, 3 ins.; January 10th, 23rd, 31st; February 6th and 7th, 8¼ ins.; February 28th; March 1st, 3rd, 6th, 17th, and 18th, 4½ ins.
1874–5	January 10th and 29th ; March 9th and 27th, 8½ inches.
1875–6	February 4th.
1876–7	February 8th and 17th.
1877–8	January 28th ; February 15th, 16th, and 17th, 5 inches.
1878–9	None.
1879–80	December 28th and 29th, 17 ins. ; March 11th and 14th, 5 ins.
1880–1	March 20th.
1881–2	January 22nd ; February 3rd, 4 inches ; February 10th, 1½ inch.

TABLE VIII.—Earthquakes.

Year.	Date.	Hour of day.	Barometer at previous 9 a.m.	Barometer at next 9 a.m.	Wind.	Weather.
1863	April 22nd	10.45 p.m.	26·972	27·308	W.	Changing with severe sandstorm from east to west.
	September 24th	8.15 p.m.	27·522	27·484	W.	Clear.
1864	March 24th	2.30 a.m.	27·472	27·466	E.	Changed from east to west in afternoon.
1868	January 24th	3.50 p.m.	27·572	27·522	W.	Changed to east next day.
	February 19th	midnight	27·262	27·252	W.	Rain and snow followed.
	October 7th	7.30 p.m.	27·527	27·552	W.	Storm, thunder and rain, changing from sirocco.
1870	June 24th	7 p.m.	27·472	27·442	W.	Clear and still.
1873	June 29th	2.30 a.m.	27·472	27·522	W.	Clear and still.
1874	March 3rd	1.40 a.m.	27·472	27·350	S.W.	Snowstorm.
1877	February 15th	7.15 a.m.	27·472	27·390	S.W.	Snow followed.
	March 14th	6.15 a.m.	27·352	27·286	N.W.	Changed from east on day previous.
1879	December 31st	9 a.m.	27·512	27·816	N.	Snow.

Table IX.—The overflow of Beer Ayûb.

Seasons.	Date of overflow.	Inches of rains which fell before.	No. of consecutive days rain immediately before.	Inches of rain which fell on these days.	Rainfall of the season Inches.
1860–1	Jan. 24th, 1861	8·2	4	5·7	21.647
1861–2	Jan. 2nd, 1862	10·6	3	3·5	24·262
1862–3	Jan. 26th, 1863	10·9	5	5·6	22·862
1863–4	Jan. 9th, 1864	12·2	3	3·6	20·338
1864–5	Did not flow		..	..	15·475
1865–6	Jan. 9th, 1866	9·8	4	3·2	18·990
	March 1st, 1866	15·2	4	2·1	
1866–7	Jan. 9th, 1867	9.9	7	4·6	26·737
	Jan. 26th, 1867				
	Feb. 26th, 1867				
1867–8	Feb. 3rd, 1868	14·3	2	1·6	29·058
1868–9	Dec. 13th, 1868	8·3	2	3·6	24·916
1869–70	Did not flow		..	..	12·289
1870–1	March 9th, 1871	14·5	7	3.4	19·158
1871–2	Dec. 16th, 1871	7·6	3	5·9	18·481
1872–3	Dec. 26th, 1872	9·7	3	5·6	18·942
1873–4	Dec. 27th, 1873	10·4	1	2·4	39·512
1874–5	Feb. 5th, 1875	12·7	2	1·9	26·610
1875–6	Did not flo w		..	..	16·445
1876–7	Feb. 10th, 1877	10·7	6	6·7	13·700
1877–8	Dec. 31st, 1877	14·5	1	2·1	42·932
1878–9	Did not flow		..	..	15·310
1879–80	Jan. 7th, 1880	7·4	5	1·7	23·565
	March 13th, 1880				
1880–1	Doubtful		..	..	26·585
1881–2	Feb. 5th, 1882	12·7	6	5·5	25·005

Table X.—To show connection of price of wheat with rainfall.

Seasons	1860–1	1861–2	1862–3	1863–4
No. of rainy days	40	44	..	43
Total rainfall .. .. inches	21·6	24·2	22·8	20·3
Latter rain .. .. inches	2·975	1·475	4·112	1·675
Price of wheat .. piastres	17	16	12	18

TABLE X—*continued.*

Seasons	1864–5	1865–6	1866–7	1867–8
No. of rainy days	37	58	65	62
Total rainfall .. .. inches	15·4	18·9	26·7	29·0
Latter rain .. .. inches	1·135	2·436	4·649	3·913
Price of wheat .. piastres	23	21	18	22
Seasons	1868–9	1869–70	1870–1	1871–2
No. of rainy days	61	43	49	53
Total rainfall .. .. inches	24·9	12·2	19·1	18·4
Latter rain .. .. inches	3·417	5·499	3·760	1·628
Price of wheat .. piastres	18	28	25	18
Seasons	1872–3	1873–4	1874–5	1875–6
No. of rainy days	46	71	57	51
Total rainfall .. .. inches	18·9	39·5	26·6	16·4
Latter rain .. .. inches	1·555	6·352	6·830	2·315
Price of wheat .. piastres	24	24	18	17
Seasons	1876–7	1877–8	1878–9	1879–80
No. of rainy days	41	68	37	55
Total rainfall .. .. inches	13·7	42·9	15·3	23·5
Latter rain .. .. inches	·935	2·952	3·025	4·755
Price of wheat .. piastres	34	25	39	29

NOTE.—A measure of wheat weighs about 48 lbs. English. A piastre is about twopence.

of 21 years. Obs. at 9 a.m.

Years.	January.				February.				March.				April.			
	Mean reduced to 32°	Highest.	Lowest.	Monthly range.	Mean reduced to 32°	Highest.	Lowest.	Monthly range.	Mean reduced to 32°	Highest.	Lowest.	Monthly range.	Mean reduced to 32°	Highest.	Lowest.	Monthly range.
1861	27·405	27·630	27·127	·503	27·566	27·782	27·142	·640	27·406	27·596	27·166	·43	27·420	27·592	27·200	·392
1862	27·448	27·622	27·232	·390	27·443	27·546	27·255	·291	27·452	27·618	27·330	·288	27·420	27·598	27·150	·448
1863	27·480	27·672	27·125	·547	27·488	27·606	27·322	·284					27·341	27·552	26·972	·580
1864	27·472	27·722	27·242	·480	27·430	27·658	27·112	·546	27·411	27·656	27·350	·306	27·306	27·522	27·110	·412
1865	27·431	27·660	27·342	·318	27·332	27·572	26·972	·600	27·393	27·600	27·372	·228	27·412	27·632	27·370	·262
1866	27·435	27·740	27·200	·540	27·437	27·738	27·284	·454	27·400	27·656	27·312	·344	27·357	27·630	27·242	·288
1867	27·466	27·692	27·272	·420	27·507	27·722	27·392	·330	27·317	27·554	27·172	·382	27·339	27·566	27·272	·294
1868	27·456	27·722	27·272	·450	27·383	27·772	27·252	·520	27·363	27·600	27·222	·378	27·361	27·622	27·200	·422
1869	27·447	27·772	27·202	·572	27·464	27·710	27·232	·478	27·324	27·536	27·202	·334	27·404	27·652	27·321	·331
1870	27·464	27·742	27·350	·392	27·456	27·670	27·200	·470	27·399	27·514	27·100	·404	27·389	27·722	27·230	·492
1871	27·481	27·712	27·390	·322	27·454	27·772	27·322	·450	27·416	27·582	27·246	·336	27·347	27·562	27·272	·290
1872	27·450	27·710	27·342	·368	27·448	27·700	27·272	·428	27·379	27·672	27·222	·450	27·355	27·548	27·282	·266
1873	27·512	27·770	27·284	·486	27·426	27·742	27·272	·470	27·315	27·552	27·112	·440	27·397	27·692	27·232	·460
1874	27·436	27·772	27·072	·700	27·426	27·746	27·160	·586	27·371	27·658	27·140	·518	27·402	27·610	27·360	·250
1875	27·468	27·706	27·092	·614	27·368	27·664	27·172	·492	27·335	27·686	27·082	·604	27·418	27·592	27·232	·360
1876	27·519	27·772	27·030	·742	27·426	27·660	27·322	·338	27·353	27·540	27·122	·418	27·396	27·584	27·882	·302
1877	27·448	27·712	27·122	·590	27·439	27·692	27·234	·458	27·458	27·730	27·286	·444	27·346	27·592	27·192	·400
1878	27·469	27·704	27·308	·396	27·442	27·740	27·212	·528	27·420	27·672	27·272	·40	27·344	27·620	27·322	·298
1879	27·487	27·694	27·372	·322	27·489	27·672	27·418	·254	27·338	27·616	27·154	·462	27·415	27·624	27·402	·222
1880	27·497	27·754	27·348	·406	27·429	27·650	27·422	·428	27·378	27·634	27·156	·478	27·349	27·622	27·208	·414
1881	27·505	27·746	27·322	·424	27·329	27·578	27·047	·481	27·419	27·698	27·170	·528	27·369	27·656	27·222	·434
Mean height reduced to 32°		27·465			..	27·437	..		..	27·382	..		..	27·351		
Mean of all highest	..	27·715			..	27·684	..		..	27·618	..		..	27·604		
Mean of all lowest	..	27·240			..	27·211	..		..	27·209	..		..	27·241		
Mean monthly range	..	·475			..	·453	..		..	·408	..		..	·362		

TABLE XI—*continued.*

Years.	May.				June.				July.				August.			
	Mean reduced to 32°	Highest.	Lowest.	Monthly range.	Mean reduced to 32°	Highest.	Lowest.	Monthly range.	Mean reduced to 32°	Highest.	Lowest.	Monthly range.	Mean reduced to 32°	Highest.	Lowest.	Monthly range.
1861	27·421	27·538	27·262	·276	27·397	27·538	27·247	·291	27·333	27·442	27·230	·212	27·349	27·422	27·275	·147
1862	27·774	27·566	27·410	·156	27·400	27·506	27·302	·204	27·379	27·462	27·314	·148	27·378	27·432	27·312	·120
1863	27·470	27·572	27·362	·210	27·405	27·522	27·320	·202	27·360	27·422	27·308	·114	27·399	27·522	27·272	·250
1864	27·4 8	27·612	27·342	·270	27·328	27·556	27·322	·234	27·279	27·454	27·333	·121	27·000	27·492	27·320	·172
1865	27·353			·344	27·466			·261	27·289			·150	27·277			·187
1866	27·374	27·542	27·382	·160	27·317	27·542	27·267	·275	27·267	27·472	27·296	·176	27·281	27·492	27·300	·192
1867	27·345	27·592	27·262	·330	27·345	27·622	27·352	·270	27·276	27·522	27·252	·270	27·295	27·472	27·322	·152
1868	27·395	27·620	27·392	·228	27·308	27·522	27·362	·160	27·282	27·472	27·272	·200	27·306	27·516	27·327	·189
1869	27·378	27·642	27·364	·278	27·387	27·622	27·384	·238	27·306	27·494	27·330	·164	27·319	27·548	27·322	·226
1870	27·411	27·720	27·418	·302	27·331	27·542	27·350	·192	27·255	27·482	27·302	·180	27·279	27·542	27·302	·240
1871	27·379	27·772	27·382	·390	27·319	27·534	27·372	·162	27·256	27·522	27·222	·300	27·292	27·508	27·324	·184
1872	27·378	27·610	27·364	·246	27·376	27·630	27·382	·248	27·281	27·482	27·312	·14	27·281	27·472	27·270	·202
1873	27·384	27·612	27·362	·250	27·373	27·570	27·392	·178	27·262	27·522	27·302	·220	27·314	27·518	27·392	·126
1874	27·417	27·612	27·334	·278	27·354	27·622	27·350	·272	27·242	27·464	27·308	·156	27·301	27·508	27·362	·146
1875	27·401	27·566	27·306	·260	27·319	27·562	27·296	·266	27·276	27·510	27·302	·208	27·321	27·570	27·322	·248
1876	27·383	27·660	27·402	·258	27·386	27·572	27·422	·150	27·282	27·450	27·366	·084	27·308	27·552	27·352	·200
1877	27·417	27·622	27·422	·200	27·397	27·622	27·422	·200	27·328	27·530	27·400	·130	27·356	27·592	27·382	·210
1878	27·352	27·572	27·252	·320	27·326	27·542	27·322	·220	27·188	27·490	27·272	·218	27·271	27·482	27·272	·210
1879	27·404	27·644	27·422	·222	27·301	27·514	27·272	·242	27·268	27·462	27·302	·160	27·285	27·472	27·322	·150
1880	27·370	27·598	27·284	·314	27·331	27·582	27·330	·252	27·284	27·506	27·282	·224	27·317	27·534	27·334	·200
1881	27·371	27·562	27·382	·180	27·382	27·628	27·382	·246	27·296	27·552	27·296	·256	27·281	27·476	27·332	·144
Mean height reduced to 32°		27·397			..	27·359	..		..	27·285	..		..	27·295		
Mean of all highest ..		27·611			..	27·567	..		..	27·385	..		..	27·505		
Mean of all lowest ..		27·355			..	27·342	..		..	27·301	..		..	27·320		
Mean monthly range ..		·260			..	·227	..		..	·182	..		..	·185		

TABLE XI- *continued.*

Years.	September.				October.				November.				December.			
	Mean reduced to 32°	Highest.	Lowest.	Monthly range.	Mean reduced to 32°	Highest.	Lowest.	Monthly range.	Mean reduced to 32°	Highest	Lowest.	Monthly range.	Mean reduced to 32°	Highest.	Lowest.	Monthly range.
1861	27·428	27·522	27·332	·190	27·511	27·592	27·422	·170	27·549	27·672	27·394	·278	27·421	27·534	27·216	·318
1862	27·445	27·502	27·416	·086	27·499	27·572	27·402	·170	27·442	27·570	27·398	·172	27·482	27·782	27·272	·510
1863	27·471	27·558	27·372	·186	27·530	27·622	27·352	·270	27·502	27·710	27·442	·268	27·413	27·670	27·200	·470
1864	27·384	27·602	27·386	·216	27·454	27·670	27·522	·148	27·428	27·658	27·342	·316	27·448	27·716	27·372	·344
1865	27·388			·227	27·486			·248	27·435			·208	27·444	27·612	27·306	·306
1866	27·351	27·572	27·396	·176	27·437	27·622	27·432	·190	27·427	27·648	27·322	·326	27·468	27·677	27·392	·285
1867	27·354	27·586	27·372	·214	27·447	27·658	27·472	·186	27·476	27·742	27·362	·380	27·402	27·722	27·240	·482
1868	27·394	27·567	27·432	·135	27·457	27·692	27·477	·215	27·459	27·706	27·356	·350	27·473	27·770	27·182	·588
1869	27·368	27·566	27·362	·204	27·505	27·722	27·504	·218	27·499	27·746	27·420	·326	27·523	27·758	27·364	·394
1870	27·401	27·612	27·342	·270	27·447	27·622	27·342	·280	27·543	27·800	27·456	·344	27·492	27·712	27·362	·350
1871	27·373	27·542	27·372	·170	27·403	27·622	27·412	·210	27·461	27·672	27·452	·220	27·483	27·712	27·318	·394
1872	27·350	27·540	27·374	·166	27·441	27·656	27·452	·204	27·464	27·720	27·404	·316	27·470	27·732	27·150	·582
1873	27·378	27·600	27·422	·178	27·456	27·632	27·440	·192	27·432	27·658	27·334	·324	27·467	27·722	27·120	·602
1874	27·385	27·668	27·430	·238	27·457	27·650	27·472	·178	27·458	27·662	27·322	·340	27·490	27·708	27·340	·368
1875	27·409	27·602	27·404	·198	27·452	27·668	27·372	·296	27·428	27·652	27·322	·330	27·471	27·710	27·442	·268
1876	27·383	27·610	27·392	·218	27·427	27·618	27·442	·176	27·449	27·672	27·372	·300	27·511	27·692	27·312	·380
1877	27·420	27·642	27·436	·206	27·450	27·716	27·406	·310	27·452	27·658	27·372	·286	27·453	27·686	27·280	·406
1878	27·322	27·542	27·302	·240	27·425	27·622	27·434	·188	27·539	27·722	27·512	·210	27·523	27·708	27·394	·314
1879	27·385	27·580	27·410	·170	27·480	27·690	27·466	·224	27·493	27·672	27·452	·220	27·459	27·816	27·242	·574
1880	27·398	27·594	27·412	·182	27·488	27·702	27·478	·224	27·493	27·706	27·340	·366	27·426	27·690	27·290	·400
1881	27·374	27·584	27·364	·220	27·456	27·650	27·484	·166	27·441	27·662	27·322	·340	27·451	27·770	27·342	·428
Mean height reduced to 32°		27·388			..	27·462	..		..	27·470	..		..	27·465		
Mean of all highest ..		27·579			..	27·649	..		..	27·685	..		..	27·709		
Mean of all lowest ..		27·386			..	27·438	..		..	27·384	..		..	27·291		
Mean monthly range ..		194			..	·212	..		..	·296	..		..	·417		

TABLE XII.—Showing the mean height, maximum and minimum height, and annual range of barometer during 21 years. Obs. at 9 a.m.

Years.	Mean height reduced to 32°.	Highest in the year.	Lowest in the year.	Yearly range.
1861	27·443	27·782	27·127	·655
1862	27·438	27·782	27·150	·632
1863	27·439	27·672	26·972	·700
1864	27·367	27·722	27·110	·612
1865	27·392	27·660	26·972	·688
1866	27·379	27·740	27·200	·540
1867	27·380	27·742	27·172	·570
1868	27·386	27·772	27·182	·590
1869	27·410	27·772	27·202	·570
1870	27·405	27·800	27·110	·690
1871	27·388	27·772	27·246	·526
1872	27·389	27·732	27·150	·582
1873	27·393	27·770	27·112	·658
1874	27·394	27·772	27·072	·700
1875	27·388	27·710	27·082	·628
1876	27·401	27·772	27·030	·742
1877	27·413	27·730	27·122	·608
1878	27·385	27·740	27·212	·528
1879	27·400	27·816	27·154	·662
1880	27·396	27·754	27·156	·598
1881	27·389	27·770	27·097	·673
21 years ..	27·398	27·816	26·972	·844

Mean annual range, ·626

TABLE XIII.—Showing mean height of barometer, reduced to 32°, at 9 a.m. during the several months of the year, and the monthly range. Mean of 21 years.

Months.	Barometer reduced to 32°.	Monthly range.
January	27·465	·475
February	27·437	·453
March	27·382	·408
April	27·351	·362
May	27·397	·260
June	27·359	·227
July	27·285	·182
August	27·295	·185
September ..	27·388	·194
October	27·462	·212
November ..	27·470	·296
December ..	27·465	·417
Year	27·396	·305

TABLE XIV.—Showing the maximum and minimum temperature, mean temperature, mean monthly and daily range, &c., during the several months of the year. Mean of 8 years.

Months.	Highest in the period.	Lowest in the period.	Mean monthly range.	Mean daily range.	Mean Temperature.	Hygrometer.		
						Dry bulb mean 9 a.m.	Wet bulb mean 9 a.m.	Difference.
January ..	74·8	25·0	31·6	13·0	48·4	48·4	44·5	3·9
February..	79·0	30·0	32·9	13·4	47·9	48·5	44·3	4·2
March ..	88·0	33·9	42·0	16·9	55·7	57·8	50·5	7·3
April ..	86·0	30·6	44·6	18·7	58·4	61·1	52·3	8·8
May ..	103·0	43·0	49·8	23·1	69·3	73·4	59·1	14·3
June ..	103·5	47·8	44·0	22·5	72·8	77·6	63·0	14·6
July ..	98·2	49·0	37·3	23·1	73·8	78·4	65·4	13·0
August ..	101·0	61·3	38·0	23·6	76·1	79·5	65·7	13·8
September	100·0	42·0	41·4	24·1	71·5	74·9	64·0	10·9
October ..	96·5	32·0	44·8	23·6	68·6	73·0	60·8	12·2
November	89·2	34·5	41·5	18·7	59·9	61·6	54·2	6·4
December	73·6	36·8	31·0	13·9	51·4	52·0	47·3	4·7
			39·9	19·5	62·8	65·5	55·9	9·6

TABLE XV.—Showing the number of days on which the wind blew from certain directions during the several months of the year at 9 a.m. Mean of sixteen years.

Months.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
January ..	1·25	5·00	5·25	2·00	1·62	6·00	4·68	5·18
February..	1·12	2·75	4·18	2·37	1·43	5·93	4·43	6·00
March ..	1·25	2·25	3·87	4·31	1·25	6·06	5·81	6·18
April ..	2·43	1·50	3·75	4·81	1·37	4·68	4·62	6·81
May ..	4·18	3·18	3·12	4·12	0·68	2·00	3·68	10·00
June ..	4·25	1·87	1·50	1·62	0·50	3·00	4·18	13·06
July ..	3·00	0·81	0·31	0·37	0·31	1·87	6·31	17·93
August ..	3·81	1·37	0·37	0·50	0·56	2·62	6·18	15·56
September	6·62	1·87	1·18	0·68	0·75	1·18	4·68	13·00
October ..	4·62	3·75	4·62	2·93	0·75	2·62	2·43	9·25
November	2·50	5·06	6·56	1·81	0·68	4·18	3·93	5·25
December	1·25	3·31	5·50	3·12	1·93	6·31	4·06	5·50
Year ..	36·28	32·72	40·21	28·64	11·83	46·45	54·99	113·72

TABLE XVI.—Showing the mean force of the wind at 9 a.m. and the mean number of calm days in each month. Mean of 10 years.

Months.	Mean force of wind at 9 a.m. 0—6	Mean number of calm days at 9 a.m.
January	0·47	10·7
February.. ..	0·67	7·6
March	0·65	5·9
April	0·63	6·5
May	0·49	6·8
June	0·41	8·3
July	0·40	7·3
August	0·32	9·1
September ..	0·33	10·3
October	0·27	12·3
November ..	0·41	11·5
December ..	0·50	11·7
Year	0·46	108·0

TABLE XVII.—Showing the mean amount of cloud and the mean number of cloudless days at 9 a.m. in the several months of the year. Mean of 16 years.

Months.	Mean amount of cloud. 0—10	Mean number of cloudless days.
January	4·4	6·8
February.. ..	4·8	5·1
March	5·0	5·5
April	3·7	8·9
May	2·4	11·8
June	1·1	18·5
July	0·6	21·5
August	0·9	18·0
September ..	1·2	17·5
October	2·3	12·2
November ..	3·5	8·0
December ..	4·6	6·7
Year	2·8	140·0

LIFE, HABITS, AND CUSTOMS OF THE FELLAHIN OF PALESTINE.

By the Rev. F. A. Klein.

(*From the "Zeitschrift" of the German Palestine Exploration Society.*)

Before giving a slight sketch of the Fellahin method of agriculture, it will be as well to describe the present state of the Land Tenure. It is of three kinds :—

I. *Ard miri*,[1] or taxed Crown land.

In this class are included nearly all the large and fruitful plains like those of Jaffa, Ramleh, and Esdraelon. These lands are leased by the government to various individuals, or sometimes to a whole village. The lessee pays a tenth of the produce of the soil for his right of cultivation. *Miri* land, therefore, cannot be sold by the lessee, nor has he the power to transfer it ; he merely possesses the right of cultivation for a given time, and this only holds good during the lifetime of the lessor. In the event of his death, the contract he has made becomes null and void, even though its term be not expired.

The *muzāra'a* descends to his children. Should he not have any, it goes to his brothers or sisters or their descendants, and failing them, to his father or uncles and cousins on the paternal side. In the case of a man possessing none of the above-mentioned relations, the *muzāra'a* reverts to the State. A few years ago a large piece of land, in the plain of Jezreel, fell in in this manner, and was sold by the government to the firm of Sursuk in Beirut.

II. *Ard wakúf*, or glebe-land, is land which has been left to the Mosques and Holy Places, or for the maintenance of schools and religious institutions. Rich tracts of such land are owned by the Mosque of Omar, the Neby Daud sepulchre, and the Mosque in Hebron. These lands cannot be sold, but only leased. The lessees are responsible, not to the government, but to the *mutawelí* or bailiff, who retains a share of the tithes for himself. By this means many poor Effendi families obtain an income. Great abuses have crept into the management of the *wakúf*, and there is only too much foundation for the complaint that the Effendis "eat up" and misappropriate the revenues.

III. *Ard mulk*, or freehold, is chiefly composed of small pieces of ground in the neighbourhood of the villages, such as fig and olive plantations, gardens, and vineyards. These are generally enclosed by mud walls or cactus hedges. The proprietor is, of course, free to sell them if he thinks fit, or, as it often happens, to exchange[2] them for other *mulk* lands. Hitherto the title-deeds of these lands have been drawn up by a writer in

[1] Shortened form of *ard emiri*—land of the Emir.

[2] *Badal*—exchange; *baya*—sale.

the village, and provided they had the necessary names of witnesses and the proper seals, the owner's right was not disputed. Lately, however, the Turkish government has been trying to get even the *mulk* under its control.

In some parts of Palestine there is a good deal of *ard bawr*, or fallow land. This is due partly to the scantiness of the population, and partly to the prevailing poverty and indolence. There is not much in the fertile valleys, but in the hilly districts some of the land only bears a thin crop of grass in the spring-time, which forms but scanty pasturage for the cattle. The *bellān*, a kind of thorny shrub, also grows on this poor sort of land. It is collected in large quantities by the charcoal-burners, and when burnt with *jift*[1] it gives a tremendous heat and is valuable for fuel. Sometimes the dry grass and herbage on such land is set on fire, and the hill, by this means, is slightly manured, but manure does not enter into the farming operations of the Fellahin. Both the supply and the means of transport are wanting, so it is only used in the gardens and occasionally in the olive and fig plantations.

Ard majamid (dead land) is land which has not been under cultivation for many years. If reclaimed, it becomes the *mulk* of the reclaimer. In Nazareth I have seen many good vineyards which the owners had obtained in this manner, through cultivation.

Arādi majhule (unknown land) is deserted land which has been left vacant either by the death of the owner, or by his sudden departure, which not unfrequently occurs in the event of his being in debt, or much behindhand with the taxes. Such land falls to the Crown according to the class to which it originally belonged.

Nothing affects the agriculture of a country so much as the climate. In Palestine the year is really divided into two parts—the dry season and the rainy season. As a rule, the rainy season lasts from the middle of October until about the end of April, and the dry season the rest of the year, but sometimes the rains do not commence until November or December. These months and January are generally very wet, and rain will fall almost incessantly for a week at a time. The late rains fall in March and April, but from May the vegetation depends for moisture on the dampness of the earth and the heavy night dew (*nada'*). During six months not a drop of rain ever falls, save in a very exceptional year. The Fellahin, like ourselves, divide their year into four seasons, *rabia'*, *sayf*, *kharif*, and *shita*—spring, summer, autumn, and winter. The spring begins in February, which is much the same as our April, an uncertain, showery month; still, according to the Fellahin saying, February "blows with the breath of summer." March is called the month of earthquakes and storms, but "the shepherd can dry himself without fire," namely, in the warm sun. The late rains are considered so precious that there is a saying to the effect that April rain does more good than the plough and the oxen In July the heat becomes excessive.

[1] The remains of the olives after the oil has been pressed out.

Sometimes as early as October, but oftener about the beginning of December, when the rains have softened the cracked and burnt-up earth, the Fellah puts in the winter seed, wheat, barley, and lentils. The earth is broken up with a most primitive plough, in fact, the surface of the ground is scratched up rather than turned, the furrow never being deep. The plough is drawn by a yoke of oxen, or an ox and an ass, and sometimes by a camel, but very rarely by a horse. The ploughman urges on the animals with a long staff furnished with an iron point; this he also uses for breaking up the clods of earth. Except in the case of young animals not used to the plough, the progress is very slow. When the animals are their own, or if they happen to be ploughing for someone else, the Fellah does not hurry them. The plougher will often pass over deeply-rooted thorns rather than take the trouble to press more heavily on the plough. Where, from the rocky nature of the ground, or from a thick growth of thorns, the ploughing is very difficult, a sort of pickaxe or hatchet is also used. Many bits of stony ground, especially amongst the mountains, are only picked up, and light ground which can be worked without being moistened is sometimes merely sown. In such ground the seed springs up directly after the rain and yields an early crop. But in the absence of rain, seed thus sown is often lost. The putting in of the winter crops often lasts till January; it is slow work, for some of the people have to travel with their oxen a two or three hours' journey before reaching their land, and have to return again in the evening. The winter crops are succeeded by the summer crops of dura and sesam, which grow in the dry season. A season of heavy rains is always followed by an abundant harvest, for the moisture sinks deep into the earth, and is, so to speak, stored up. Tobacco, cotton, cucumbers, and melons are also grown in the summer. They are planted after the rains, and ripen during the hot months, the heavy night dew aiding their growth.

It has been already mentioned that by far the greater part of the cultivated land is not private, but government property, either *miri* or *wakûf*, and that the cultivator is merely the holder. Each district has certain tracts of such lands, and after the rains they are let to the different inhabitants in separate plots. The division is decided by lottery. Herr Schick has given an account of the manner in which this lottery takes place. All those who are desirous of land assemble in the *sâha* (an open place generally in front of the inns). The Imam, or *khatib*, who is writer, accountant, and general archivist to the whole village, presides over this meeting. The would-be cultivators notify how many ploughs they can muster. If a man has only a half-share in one, he joins another man with a like share. Then the whole number is divided into classes. Supposing the total number of ploughs to be forty, these would be divided into four classes of ten, and each class would choose a Sheikh to represent them. The land of course varies in quality, and this division into classes makes the distribution simpler. Say, they are four classes, the land is divided into four equal portions, so that each class may have good as well as bad. When the Sheikhs have agreed that the division is fair, the lots are drawn.

Each of the sheikhs put some little thing into the *khatib's* bag. Then the *khatib* calls out the name of one of the divisions, and some passing child is made to draw out one of the things from the bag, and to whichever Sheikh it belongs, to his class belongs the division named by the *khatib*. This decided, the Sheikhs have to determine the individual distribution of the land. In the case of ten ploughs to a class, they do not each receive a tenth piece of the whole, but, in order to make it as fair as possible, the land is divided into strips, so that each portion consists of a collection of strips in different parts of the village lands. The boundaries are marked by furrows or stones, and to move a neighbour's landmark is still accounted an "accursed deed," as in the days of ancient Israel (Deut. xix. 4).

The harvest begins as early as the middle of April or the beginning of May in the valleys, but later in the mountains. In the wide-spreading plains of Gaza, Esdraelon, and Jaffa, the reaping and transport of grain employs many hands, and attracts numbers of poorer Fellahin from their own villages to act as reapers, whilst many poor widows go with their children to glean. Every evening these latter thresh their gleanings with a stone or a piece of wood. I have often known poor women, who, after a few weeks' gleaning, returned home with enough grain to carry them through the whole year. The reapers generally wear a leathern apron to protect their chest and legs. The grain is cut down with a *manjal*, or sickle, but not very close to the ground. As soon as he has an armful, the reaper binds it into a shock, and throws it on one side. These shocks are collected into bundles and carried by donkeys or camels to the threshing-floor. In spite of the great heat, the work of harvesting is always done cheerfully, and the song of the men and the shrill *zagharit* of the women may often be heard floating over the hills and valleys.

The threshing-floor is a flat place in the neighbourhood of the village. If possible, a rocky place is chosen, so that it may be easily swept. Where this is not obtainable, a hard, flat piece of ground is made to answer the purpose. The floor is common property, but each thresher keeps to a certain part of it. For four months the Fellah has nothing to fear from rain or bad weather. During that time he almost lives at the *beiyâdir* (threshing-floor) and some of the villages are nearly deserted, at least by the men. The wheat, &c., is spread out, and the oxen and asses are driven round so many hours a-day to tread out the grain with their hoofs, at the same time treading and softening the straw so that it becomes fit for fodder. This straw is called *tibn*, bundles of ordinary straw and stubble they call *kash*. The animals as a rule are not muzzled. Another method is the use of a weighty plank, into the under side of which are sunk a number of small bits of basalt stone, forming kind of teeth. This instrument, called a *môrej*, and made somewhat in the fashion of a sledge, is drawn by a horse over the heap of unthreshed barley or wheat, and crushes out the grain partly by its weight, for the driver sits upon it, and partly by the sharp teeth which tear the corn. The grain being separated from the straw, the work of winnowing begins. This must be done whenever there is a gentle breeze, for with too much or too little wind it is

equally impossible. The threshed grain is tossed with a three-pronged wooden fork; the wind scatters the chaff to a distance, and carries away the dust. The grain is next collected into large heaps, and arranged in certain ways so that it cannot be disturbed without the knowledge of the owner. Besides this, the floors are constantly watched, and at night the owners generally sleep beside their grain. Great care is taken to guard against fire; a really destructive one is of very rare occurrence. From the grain thus stored the *'ashr*, or tithes, are assessed and are paid direct to the government or to the *wakûf*. The extortion and oppression which results from this system is but too well known.

Very often a portion of a peasant's harvest is due to some townsman from whom he has borrowed money, and this is always claimed after the threshing, excepting when the negligence of the lender, or some stratagem on the part of the borrower, delays the evil day. The Fellah finds it very easy to borrow money, but thinks it very hard to be obliged to pay it back. If a ploughman has been employed, he now receives what is due to him. The *khatib*, too, has his reward. This worthy not unfrequently acts in the capacity of village barber. In short, when the Fellah requires anything, and has no money, he puts off payment until the "time of threshing," and then everyone seeks as speedily as possible the settlement of their claims. Dervishes, poor priests, the blind, and the lepers all make a pilgrimage to the *bedar*, and seldom leave it empty-handed. Many a small peasant, after he has settled the numerous just and unjust claims on his produce, has scarcely enough grain left to carry on his family until the next harvest, and many, after a few months, have again to borrow money in the city on the same security. The well-to-do Fellah carries his grain away in sacks on donkeys or camels, and sells what he does not want at the corn-market. Sometimes it is carried long distances. Every year lines of grain-laden camels are driven from Hauran to Nâblus and Jerusalem. A great deal is also bought up by brokers and sent to Jaffa, Haifa, and Akka. The rest of the grain is stored in magazines, dry rooms or underground granaries; and the straw kept for the cattle is also stored in dry places, very often in caves in the rocks. On an average the crop shows a return of six-fold the amount sown; twelve-fold is considered very good, but the sixty or a hundred-fold of the New Testament is not yielded in the present day.

The measure by which the Fellahin divide their land is the *feddân*. It is decided by the amount which a man with a yoke of oxen can plough per day, and is therefore a most uncertain measure.

Besides the cultivation of grain, which forms the chief employment of the people dwelling in the great plains, the care of the vineyards, and the fig and olive plantations, takes a good deal of time and attention.

Vines are generally planted in the hilly districts, the slopes and natural terraces being well suited for them, whilst such rocky land is useless for cultivating grain. Many of the villages own fine vineyards, some near, some at a distance, but unluckily large tracts of land, well suited for the purpose, and apparently used for it in former times, now lie uncultivated.

The vineyards are enclosed by stone walls or cactus hedges. With the somewhat too plentiful supply of stones, artificial terraces are made on which the vine can climb and hang over. In some places the vines are allowed to trail on the ground, as in Nazareth and Ramleh ; in others they they are trained upright, as in Kolonia and Abu Ghosh, near Jerusalem. A watch-tower is built in the vineyards, generally of large stones without mortar, and on the top of it is a little hut roofed with branches. From this coign of vantage the vineyard can be overlooked and watched ; near it there is often an arbour formed of rough tree stems, and covered with vines. There are no wine-presses. The Fellah does not understand the art of making wine, and the majority of them being Mussulmans, they dare not attempt it. In many of the vineyards the old wine-presses of the Canaanites and Hebrews are still to be found in the form of two basins hewn in the rock, one into which the grapes were pressed, the other, on rather a lower level, for the juice to run into, by means of a connecting channel.

The Fellahin of Bethlehem and Beit Jala certainly attempt to make wine, but as they neither understand the process nor have any means of keeping it when made, the result is very poor stuff. The work in the vineyards consists in hoeing and breaking up the ground several times after the rains, and in pruning the vines. Bits of rock are carefully taken out of the ground, but beyond this the Fellah bestows but little pains on his vineyard. A newly planted vineyard will bear fruit in three years. All kinds of fruit trees as well as vines are planted in the vineyards—fig-trees, pomegranate, apple, pear, apricot, peach, quince, and mulberry trees. Directly the fruit is of any size the owner's family watch over it, and as soon as it becomes eatable they take up their abode at the vineyard, and remain there until it is all over. Everyone tries to pass some weeks or months during the hot unwholesome summer in a vineyard. Those who do not possess one hire a portion of one, and the well-to-do townsman counts himself lucky if he can camp out with his wife and children in a vineyard, living in a tent or a booth. Few noble families seeking change of air and scene at Ems or Kissengen are as happy as the Arabs under the shade of their fig-trees. A greater part of the daily food of the family then consists of bread and fruit. At this time of year many of the poorest people about Lydda and Jaffa subsist almost entirely on *sabr* and a little bread. The grapes which have not been consumed are carried in boxes or baskets to the next market, or to villages which have no vineyards. At these latter they are often exchanged for grain, the people being usually employed in threshing. Hebron is celebrated for its grapes, and so also is Es Salt, on the other side of Jordan, from whence come the much-prized "Cibeben."

In some neighbourhoods, instead of vineyards there are fig-gardens. The district around Bethel, and as far as the beginning of the Nâblus valley, is famed for them. A good portion of the figs (*tîn*), of which there are various sorts, are eaten when ripe, but the greater portion of them are dried in the sun and kept for winter consumption. To lay in a sufficient

quantity of dried figs is an essential part of the provisioning of a well-ordered Fellahin household. Dried figs are also used for producing spirit. The fig-gardens are sometimes dug up or hoed, but no further attention is paid them.

The finest plantations of olives are in the Nâblus district, but nearly every village has its larger or smaller grove. There is no doubt that the olive-tree is one of the most valuable products of the country, and that it could be made a still greater source of revenue than it is at present. It requires but little attention, and lives and yields fruit even when neglected. It only requires grafting and a little digging up and clearing out, and this done, it yields a plentiful crop in return for the small amount of pains bestowed upon it. The Fellahin say that the vine is a *sitt*, a delicate town lady who requires a great deal of care and attention; the fig, on the contrary, is a *fellaha*, a strong country woman who can flourish without such tender care, but the olive-tree is a bold *bedawije*, who, in spite of neglect and hardship, remains a strong and useful Arab-wife.

The olives ripen towards the end of the summer; the trees are then beaten with long sticks, care being taken not to destroy the young leaves and shoots. The fruit is collected and spread out on the roofs, or somewhere, and then put into heaps for a little while in order that it may slightly ferment, after which it is taken to the oil-press, where it is crushed under a heavy millstone and, packed in little straw baskets, is finally pressed. The oil (*zayt*) runs into a little cemented cistern, from which it is drawn in leathern bottles or large earthenware jars for carrying away. The Fellah uses it both for light and nourishment. If he has nothing better, he is content to eat some bread soaked in oil. It is also used a great deal in the town cookery, but as a means of light it has been almost superseded by petroleum. A great deal of inferior olive oil is used for making soap, and some years a great deal of oil is exported to France and Italy. The *jift*, or refuse of the olives, is used for fuel, having great properties of heat.

With regard to vegetables, their cultivation is only successful where irrigation is possible, though there are a few kinds which will grow without such, as gherkins, vegetable marrows, and tomatoes. Those which will grow dry are called *ba'l*, those which require water, *sakī*. In irrigated gardens all sorts of vegetables are planted, cabbages, turnips, pepper plants, radishes, egg plants, and sugar peas. If the water for several gardens is supplied by one spring, a fixed time is arranged for each owner to turn the water in his channel on to his land. The fruitfulness of the land when irrigated is really astonishing.

In cattle breeding the Fellahin are not successful. The oxen and cows are under-sized, and are kept entirely for agricultural purposes; it is only when they are of no further use for work that they are sold to the butcher. Fattened cattle are unknown. Very few sheep are kept, and mutton, which is the favourite meat, is either obtained from the Bedawîn, or else it is brought from Kurdistan or Hedschaz. The Fellahin, however, keep a great number of goats; cheese is made of their milk, and also the *laben*,

of which the Arabs are so fond. Butter is but little made, and *samn*, a kind of ghee, is seldom used except by the Bedawîn. The best time for dairy produce is in the spring, when the early herbage appears, but when this is dried up a bad time begins for the unlucky cattle. The goats fare best, for they are turned out in all weathers, and can often find food on the hills. When the season is very bad, they are given oil-cake made from sesam. Sheep, and even goats, have a hard struggle to subsist through the winter months, and many an animal dies a miserable death for want of proper nourishment and care. Oxen and cows are fed throughout the winter on *tibn*, or crushed straw. Living the hard life that he does himself, the Fellah can hardly be expected to take much care of his cattle. If one animal after another dies from want of care, it is the will of Allah, and he must submit. He bears it philosophically, and tries by cheating and deception to recover the loss.

A townsman once entrusted a Fellah in Siloah with a number of goats in which they were "to go halves," that is to say, that for the trouble and cost of maintaining the whole, half the goats and half their offspring were to become the property of the Fellah. This sort of partnership is often entered into in the case of a horse. After a time the townsman sent to inquire how the little flock was getting on, and received the joyful news—*walladen*—"they have kids." The townsman now hoped for a good supply of milk, but soon came the unwelcome intelligence—they are giving no milk—and a little later on came word that they were dead. Whether it was all true, or whether the Fellah had over-reached him, the townsman could never ascertain. In the spring and early summer, when there is good stubble-feeding for the cattle, the cowherd drives them to the fields every morning, and brings them back at night.

If, as it often happens in the colder districts, no grass is to be found, the larger cattle owners depart with their cattle to warmer lands near the Jordan Valley and winter there, living in the open by day, and taking shelter at night in the natural caves with which the country abounds.

And here I must close these notes on the rural economy of the Fellahin. To enter into fuller details would swell them from a paper into a volume.

THE NAMELESS CITY.

The position of the city where Saul met Samuel (1 Sam. ix) is without doubt the most perplexing question in Biblical topography. We seem to be hopelessly involved in the following dilemma: Saul, in walking from a city apparently *north* of Jerusalem to his destination also *north* of Jerusalem, passes Rachel's sepulchre, four miles *south* of it. How is this apparent contradiction to be satisfactorily explained?

It is proposed to show (I) that the nameless city was certainly Ramah, where Samuel usually lived and was buried; (II) that it was close to

Rachel's sepulchre, and therefore (so far as I can see) on the Beit Jála hill; and (III) that it was identical with Ramathaim-Zophim.

The chapter on the Bakoosh cottage in "Finn's Byeways" led me three years ago confidently to place the city two or three miles further south, near Solomon's pools. Further consideration demanded by Captain Conder's objections (1879, 171; 1880, 104), and especially by Lieutenant Mantell's careful report (1882, 165), apparently forces me to place it *at* or *near* Beit Jála. It would, however, be well if the few seeming points of difference between that report and Mr. Finn's remarks could be fully explained.

The following points seem to me to admit of no dispute:—

1. Kubbet Rahil is practically the correct site of Rachel's sepulchre (1880, 241).
2. Saul's destination was either Gibeah, or possibly Jerusalem (1 Chron. viii, 32) or Zelah (2 Sam. xxi, 14); at any rate, it was north of the latitude of Rachel's sepulchre.
3. Saul *naturally, i.e., without going out of his way*, passed on his return near that sepulchre.

Common sense seems to insist on this last condition, and so we may reject off-hand all proposed sites that do not satisfy it. Accordingly, Dr. Robinson, after proposing Sóba, practically withdraws it on account of the circuitous route which Saul would have to take. More recently Mr. Henderson (1882, 63), supported by Captain Conder (157), would identify Kirjath-'Erma not only with Kirjath-Jearim but also with "the nameless city." Two fatal objections why Khirjath-'Erma could not be the former place remain as yet unanswered (61; against its being the latter, stands the irresistible condition 3. The Survey Map proves a very effective weapon against error, and gives the happy despatch to many wrong identifications, and not least to Kirjath-'Erma. For measurement shows the following results:—

From Kirjath-'Erma to Gibeah is about 11 miles.
" " " Rachel's sepulchre 8 "
" Rachel's sepulchre to Gibeah 8 "

It is absurd to suppose that Saul would travel along two sides of a triangle instead of the third, and that in going from Kirjath-'Erma to Gibeah (64) he would *go round* by Rachel's sepulchre, *south* of the latitude of Kirjath-'Erma.

"The nameless city" cannot have been to the north of the latitude of Rachel's sepulchre, and therefore it was not at either Bethel or Gilgal or Mizpah or Kirjath-Jearim, which has never (so far as I know) been placed at all to the south of Rachel's sepulchre. All such proposed sites stand condemned by condition 3.

1. The following points seem to indicate that the city was Ramah, while *e* settles the question decisively.

a. Josephus calls it Ramah. Formerly I thought his statement an "unlucky conjecture." Now I believe the story strictly requires it.

b. Though Ramah is not named in ch. ix, x, it is met with in viii, 4, where the story begins.

c. It is objected (1882, 63) that Samuel is not once spoken of as "dwelling" in the city. This omission, however, has no force, since Ahijah the Shilonite is not said to dwell at Shiloh (1 Kings xiv, 2, 4.)

d. It is urged again (63) that the words (ix, 12, 13), "He came *to-day* to the city; for the people have a great sacrifice on the high place. . . . . The people are not accustomed to eat till he comes, for he blesses the sacrifice," suggest that Samuel was only "therefore the occasion of the sacrificial feast."

The Speaker's Commentary, however, points out that "to-day" may only mean "now, just now." Samuel may quite recently have come into the city from the fields outside, or from out of his house. Further, it is hardly credible that Samuel had arrived at the city for the first time on that day, since it is stated (ix, 15), "The Lord had told Samuel a day before Saul came, saying, To-morrow about this time I will send thee a man out of the land of Benjamin." Surely, after this, to go to another city would be exactly what Samuel would *not* do.

e. The conclusive point, however, is that Samuel's house was in the city (ix, 18), and so it is specially noted of Ramah in vii, 17, "There was his house." One who took no bribes, and lived in such retirement that he was not even by sight known to Saul, would certainly not have both an object and the means for keeping up, besides his home at Ramah, a second house and cook in another city quite distinct from the four holy places named above.

f. Lastly, Ramah was a most suitable place (1882, 64) for a great sacrifice, for "there Samuel judged Israel, and there he built an altar unto the Lord" (vii, 17). I conclude, therefore, that the city certainly was Ramah, the dwelling-place of Samuel.

II. Its position was south of the latitude of Rachel's sepulchre. This seems at first sight to open a wide field. Jebel Fureidis has been suggested by Gesenius; Rameh, north of Hebron, by Lieutenant Van de Velde on account of the name. There are, however, too many hills and Ramahs in Southern Palestine for elevation and name to be of much use.

Perhaps the words in ix, 4, 5, may imply that the land of Zuph, and therefore the city, was *in* or *near* the land of the Benjamites. Again, on the third day towards evening, when their bread was spent, Saul and his servant came near the city, and the former proposed to return home. Probably there was time to reach it before dark. Happily there is no need to press these points, as the sacred narrative itself fixes the position of the city close to Rachel's sepulchre. It is stated in x, 2, "*When* thou art departed from me to-day, then thou shalt find two men by Rachel's sepulchre." Mr. Henderson has for three years made the admission (though it really tells against his site at Kirjath-'Erma) that these words indicate (1879) "that *just on leaving Samuel, immediately* therefore, Saul

would be at that spot ;" and again, that (1882, 64) "the prophet anointed the king, *not far* from Rachel's sepulchre."

This witness is true. It is a mistake, however, to give Samuel several miles' walk in the early morning, for the anointing took place not only not far from Rachel's sepulchre, but also *close to the city ;* as they were going down to the end of the city, Samuel said to Saul, ". . . stand thou still. . . . Then Samuel took a vial of oil," &c. (1 Sam. ix, 27 ; x, 1). Therefore the city itself was not far from Rachel's sepulchre.

The place thus named Ramah, and situated near Rachel's sepulchre, was further in "the land of Zuph." It is a remarkable coincidence that Elkanah or one of his ancestors named Zuph was an Ephrathite, and so was connected with Bethlehem or Ephrath (1 Sam. i, 1) ; while the Kohathite Levites, to which family Zuph and Samuel belonged, had a very strong reason for being partial to the neighbourhood of Bethlehem. From this Zuph, part of the adjoining country may easily have got the name of "the land of Zuph."

The existence of a Ramah near Bethlehem, which has thus been proved, completes the adaptation of Jer. xxxi, 15, to the slaughter of the Innocents (Matt. ii, 18) "in Bethlehem and in all the *coasts* thereof." Then literally "In *Rama* was there a voice heard. . . . Rachel weeping for her children."

We have now to search for a site not far from Rachel's sepulchre which satisfies the local indications of 1 Sam. ix, x.

(1.) There was an ascent to the city from the direction of Saul's approach, down which apparently the maidens were going to draw water. On this side there must be a water supply.

(2.) There was descent in the direction of the way towards Rachel's sepulchre (ix, 27).

(3.) There was higher ground adjoining—the site of the high place.

(4). There ought to be ancient Jewish tombs on the hill.

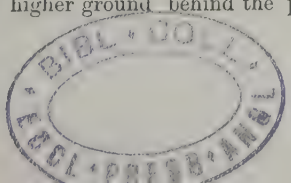
(5). Possibly we ought to find near it something answering to the great well in Sechu. Besides, we have the expression, "Naioth in Ramah."

Is there any suitable place possessing these characteristics? Bethlehem itself, which Captain Conder has now discarded for Kirjath-'Erma, was once (1879, 171) suggested by him. It is, however, inadmissible, since from Bethlehem Samuel (1 Sam. xvi, 13) returned to Ramah. The only hill that seems to me available is that of Beit Jâla, and this I believe to be the right spot.

To suit (1) there is a cistern on the northern side called Bir Auna, and a spring and trough named Hand Kibryan on the south-west of the hill. From one of these sides Saul might have approached the city on this hill, and in both cases there is an ascent.

To suit (2) there is a descent from the hill in the direction of Rachel's sepulchre.

To suit (3) there is higher ground behind the present village of Beit Jâla.



To suit (4) it may be stated that Captain Conder has suggested Beit Jâla as a possible site for Gallim.

It is probable, then, that old tombs have been already discovered there, or sufficient remains to prove that it is an ancient site.

I no longer stand in need of the argument I wished to draw from the identification of the places named by Samuel, with various spots within view, when he anointed Saul. I may state, however, that from the Beit Jâla hill Rachel's sepulchre is well in view; Jerusalem may also be seen, and probably the Mount of Olives, as well as the hill south of Jerusalem (1879, 130).

The sepulchres on the Bakoosh hill described by Lieutenant Mantell seem to me to point to the former existence of habitations close by, which must, I fear, always remain a *nameless* city.

III. Having proved that "the nameless city" was really Ramah, Samuel's ordinary residence, and that it was situated on the Beit Jâla hill, we now come to the difficult question how such a position can be reconciled with 1 Sam. i, 1, "There was a man of Ramathaim-Zophim, of Mount Ephraim, and his name was Elkanah . . . the son of Zuph, an Ephrathite."

The following explanations suggest themselves:—

1. Elkanah may have formerly lived in Ramathaim-Zophim, in Mount Ephraim, but removed to the Ramah near Bethlehem before Samuel was born.
2. He may have been living in Ramathaim-Zophim, in Mount Ephraim when Samuel was born, and afterwards he or Samuel may have removed to the other Ramah.
3. He may have been an inhabitant of Ramathaim-Zophim, but have lived originally in Mount Ephraim.
4. Mount Ephraim may have reached to Bethlehem.
5. Mount Ephron was the original reading, and, not being understood, was altered to the well known Mount Ephraim.
6. Mount Ephrath (as the name of the district near Bethlehem or Ephrata—like Mount Bethel near Bethel) was the original reading, and, being an unusual expression, was somehow changed into Mount Ephraim.

Of these, I reject 1–4 as quite indmissible, though it is remarkable that, though Samuel was buried at Ramah, it is not added "in the sepulchre of his father," as is the case with most of the Judges; 5 and 6 alone seem to me credible, and I prefer 6, since all the change needed is to read ת for ם.

Dr. Robinson says that "Ramathaim-Zophim probably signifies nothing more than Ramah of the Zuphites or descendants of Zuph" in other words, Ramah in the land of Zuph.

A report by Lieutenant Mantell on the Beit Jâla hill (like those on the Bakoosh hill and Khurbet Adasah) would doubtless be most interesting and valuable.

August 1st, 1882. W. F. Birch.

EMMAUS IDENTIFIED.

By Mrs. Finn.

Among the many questions of interest that occupied our attention while living in Jerusalem, there was none more attractive than this "Where was the Emmaus of St. Luke's Gospel?"

During the first ten years after our arrival in Palestine, we had sought the reply, but had found none that could be considered satisfactory, although various travellers and writers on the topography of Palestine had dealt on the question.

Dr. Robinson, successful as he had been beyond all that went before him in identifying long lost sites, had in this instance resorted to that refuge for distressed critics, "a different reading" of the sacred text, and suggested that St. Luke had originally written as to the distance of Emmaus from Jerusalem—not three score furlongs, but *one hundred* and three score furlongs. Dr. Robinson thought that this altered reading would allow of the Emmaus of St. Luke's Gospel being identified with the Emmaus afterwards called Nicopolis, on the Plain of Sharon, at the foot of the Judæan mountains, twenty-two Roman miles distant from Jerusalem.

Is not Nicopolis rather 176 than 160 furlongs distant from Jerusalem?[1]

In considering the matter on the spot, however, it appeared to us that very serious difficulties present themselves against the attempt to apply the narrative in St. Luke's Gospel to any place so far from Jerusalem as the Nicopolis-Emmaus.

First of all, the events occurred in Passover Week, which all devout Israelites spent at, if not in Jerusalem. Nicopolis-Emmaus is a distant place out of the hill country of Judah.

Secondly, a journey of twenty miles on foot up steep mountain passes, is altogether at variance with the circumstances under which the two disciples returned from Emmaus to Jerusalem that evening. On their arrival at the village, they had dissuaded our Lord from going further, because the day was "far spent" (declined). It was towards evening when at their entreaty he went in to tarry with them. Then came the evening meal, which according to the custom of the country is not commenced till at or after sunset. At Passover or Easter time, the sun sets soon after six o'clock, and there is but a short twilight in Palestine. When the disciples had discovered who their guest was, they "rose up that same hour" in their eagerness to communicate the glad

[1] Josephus also mentions an Emmaus at 60 furlongs from Jerusalem; but Dr. Robinson deals with that in the same way, and suggests "another reading" for Josephus also. Dr. Tregelles, in a letter to Dr. H. Bonar, shows clearly that the evidence of the best MSS. in favour of the revised reading of Luke xxiv, 13, is thoroughly preponderating, and decisive in favour of the 60 furlongs.—"Land of Promise," by H. Bonar, DD., p. 538.

tidings to the rest of the disciples. But it is highly improbable that they had to walk a distance of twenty miles up a continuous ascent of above 2,000 feet from the level of the plain to Jerusalem. Had they made such a journey as that, most of it steep climbing, they would not have reached Jerusalem much before midnight, and long after the time when Easterns go to rest. But on arriving they found the eleven still together. They also must have been at their sunset meal—the last for the day. But if it were 60 furlongs (7½ Roman miles), that distance could have been traversed within two hours. They arrived and told their wonderful history—and as they yet spake (Luke xxiv, 36), the Lord appeared to them, finding them still "at meat" (*ἀνακειμένοις*, Mark xvi, 14), and offered to share the scarce-finished meal: "have ye here any meat?" (food). They gave Him a piece of broiled fish and of an honeycomb, and He did eat before them, and then entered upon a conversation which could not have been a short one.

All this implies that the two disciples must have got back from Emmaus early in the night.

The word used by St. Luke in describing Emmaus being *κωμὴ*, "a village" or "hamlet," would not be applied to the Emmaus-Nicopolis on the plain, which Josephus expressly calls a *city*, and which he declares to have been well fortified with strong walls and towers (*see* "Ant.," xii, 7, 3; xiii, 1, 3; "Wars," iii, 3, 5). Jews while keeping their Passover as these disciples were doing, would scarcely go to any other *city* than Jerusalem.

It seemed to us that the Emmaus of St. Luke's Gospel must have been a country village within easy reach of Jerusalem, the walk to which would in no way interfere with the due observance of the great Paschal Festival.

All these considerations led us to continue our search for Emmaus within a circle of 60 furlongs around Jerusalem.

The only indications in the Bible are those referred to above, *i.e.*, the name "Emmaus," the distance "60 furlongs;" and the size, "a village." Josephus also mentions an Emmaus, a Roman colony, at 60 furlongs from Jerusalem, of which more hereafter.

And with regard to the name *Emmaus*, Josephus gave us a clue in its derivation and meaning, a clue of immense value. He mentions a third Emmaus, distinct from the Emmaus-Nicopolis on the plain, and from the Emmaus colony near Jerusalem.

In "Ant.," xviii, 2, 3, when describing Tiberias at the Lake of Gennesaret, he says there are warm baths at a little distance in a village named Emmaus. In "Wars," iv, 1, 3, he tells us that "Vespasian removed from Emmaus where he had pitched his camp before the city Tiberias," and adds, "now Emmaus if it be interpreted may be rendered *a warm bath*, for therein is a spring of warm water useful for healing."

This rendering of the word is undoubtedly correct, Emmaus being merely the Greek form of the Hebrew חַמַּת Hamath.

The place near to Tiberias, which Josephus calls Emmaus, is called

Hamath in Joshua xix, 35, and is to this day known by the Arabic equivalent word *Hammâm*, "hot baths."

The Syriac form of the word is Amatha, given by Eusebius and Jerome as the name of the hot springs at Godera (Um knis) which are also called Hammâm by the Arabs of the present day (*see* also Reland's "Palestine," pp. 30, 703, 755, 758).

The Emmaus-Nicopolis of the plain received its name from the fact that it also was remarkable for a fountain endued with virtue for healing man and beast, which is said to have been stopped up by Julian the Apostate. This fountain is mentioned by both Jewish and Christian writers (Reland, pp. 759, 760).[1]

The etymology of the name Emmaus led us to the conclusion that wherever the Emmaus of St. Luke might be, there must also have existed hot baths, and the modern Arabic use of the term Hammâm as applied to baths generally, whether of natural hot springs, or of water artificially heated, led us further to the idea that St. Luke's Emmaus need not be a place of hot springs, but that it might possibly be a place where abundance of water had caused the establishment of artificial baths of some importance.

We convinced ourselves before long, that there is but one place within the circuit of 60 furlongs from Jerusalem, where there is a sufficiently copious spring of water for the supply of baths. That place is the pretty valley of Urtas, which is about $7\frac{1}{2}$ Roman miles or 60 furlongs from Jerusalem, south of Bethlehem.

The valley descends from the ancient Etham (the fountain of which still bears that name), and passes round the base of the Herodium (or "Frank" mountain, called by the natives Jebel el Furaidis) on its way towards the Dead Sea.

These two places, Etham and Herodium, are among those whose distance from Jerusalem are specified by Josephus. He tells us that Etham was 50 furlongs off ("Ant.," viii, 7, 3), and that Herodium was 60 furlongs off ("Ant.," xiv, 13, 9, and "Ant.," xv, 11, 4).

Urtas, village and spring, lie between the two, and the difference between the 50 furlongs' distance of Etham from Jerusalem, and the 60 furlongs of Urtas, may be easily accounted for by the difference of the road to Urtas, which winds considerably, or by the relative position of the two places—the one higher, the other lower in the same valley.

The actual *distance* of Urtas from Jerusalem well answers the requirements of St. Luke's narrative.

[1] At the date of our search, we had not the aid of the Dictionary of the Bible, in which we afterwards found the argument against Nicopolis ably summed up, or of the "Geographie du Talmud" of M. Adolphe Neubauer.

M. Neubauer has a note on Emmaus, on p. 100 of his valuable work, and at pp. 34–38, he defines Emmaus and Hamath as being the usual appellation for thermal baths.

The Bible dictionary says that Emmaus has yet to be identified.

Nothing is more delightful on a spring afternoon than the 7 miles' walk across the Plain of Rephaim, past Rachel's tomb and Bethlehem, to this charming spot, the most charming and the most accessible from Jerusalem in the whole district.

There is here the most copious perennial spring of water to be found anywhere within the required distance from the Holy City.

It never fails, but runs with a strong stream in summer as well as winter, and it is altogether distinct from the spring at Etham, or from the other springs that supply the pools in the valley above.

The village is small, but there are remains of ancient buildings, and, indeed, it is easy to see that a village must always have existed here on account of the beautiful spring of water, yet being so near the fortified city of Etham, this probably never was no more than a village, and thus would answer to the terms used by St. Luke and by Josephus as to the size of the Emmaus to which they refer.

Here, then, is a place which fulfils the important requirements as to distance, size, and supply of water for baths.

But the name Emmaus, and its Hebrew and Arabic equivalents, were wanting, and, above all, where were the baths.

It was several years before we discovered any traces of either the name or of the baths.

While waiting for some discovery that might settle that decisive point, we studied with ever increasing interest all that served to throw light upon the past history of Urtas.

And first as to the name "Urtas,"—which has no meaning in modern Syro-Arabic nor in Hebrew, but is believed to be comparatively modern, and only a corruption of the Latin *Hortus* (garden), given to it at a period when Latin was much used and spoken in and around Bethlehem, close by.

This carries us back at least to the days of St. Jerome, whose memory is still fresh among the Christians of Bethlehem. There within the precincts of the great Convent of the Nativity is still existing the chamber where Jerome made his translation of the Hebrew scriptures into Latin. The short mile of hill and dale from thence to the valley of Urtas must often have been traversed by him and his companions—Paula with her daughter and others.

In the life of Vigilantius we get glimpses of the rural delights around Bethlehem. The city of David was then as now supplied with pure water from living springs, by the ancient aqueduct which winding around the hill sides, passes from Urtas, through Bethlehem to the Temple at Jerusalem. We know that Jerome and the Latin speaking Christians of his day regarded Urtas as the site of the Hortus conclusus, the "garden inclosed" of Solomon (Song of Solomon iv, 12). Had any Hebrew or Syrian name for Urtas been extant in Jerome's day he would surely have found and preserved it.

But the identification with the gardens of Solomon is reasonable. The proximity of the place to Bethlehem would in itself lead us to search here for the royal gardens.

Josephus tells us that they were at Etham ; the name Etham survives to this day as the name of a spring of water at the head of the valley, Ain Aitân. And the ancient city of Etham was doubtless on the mountain beside the spring. From 2 Chronicles xi, 6, we learn that Etham was near Bethlehem and Tekoa, which agrees well with the position of Urtas.

After Urtas Tekoa (now Tekua) is the very next town to Bethlehem. The Septuagint have placed Etân or Aitân among the cities of Judah, Bethlehem, Fagor, &c., inserted by them in Joshua xv. Fagor (now Faghoor) is the next important place of ancient date south of Urtas an hour distant. Josephus tells us that Etham "is very pleasant in fine gardens, and abounding in rivulets of water." No place but the Urtas valley would be thus described. He speaks of the early morning drives of King Solomon in his chariot to this delightful retreat ; and Urtas is the only place to which an easy pleasant drive across the plain would be possible.

The Song of Solomon is full of allusions to the charms of this garden, with its waters, its fragrant hills, its vineyards, its paradise (ch. iv, 13, rendered "orchard") of pomegranates and pleasant fruits.

In all points the Urtas valley with its fruit gardens and vineyards on the mountains around, fully coincides with the descriptive touches in that song.

The word *paradise* gives us a further clue. No ordinary garden or orchard can be justly described by the word *paradise ;* but only such a one as was the garden of Eden ; watered by a network of streams *parted* (Gen. ii, 10, "from thence it was *parted*" בּיד) from the fountain head, into refreshing rivulets that keep up perennial verdure and a succession of pleasant fruits upon trees growing by the rivers of waters alluded to in Psalm i, the imagery of which is probably derived from this very spot.

In Ecclesiastes (ch. ii, 5, 6) Solomon speaks of his paradise : "I made me gardens and paradises (orchards), I made me pools of water."

We find both in the Urtas valley. The pools, ascribed by ancient local tradition to Solomon, and still called by the very same word as that used in the Hebrew text, lie with the system of aqueducts in the head of the valley just below Etham ; while the word paradise lingers in the same valley below Urtas, as the native name for the Herodium, *Jebel el Furaidis*, "Mount of the little Paradise."

The aqueducts are still existing which were carried from the one to the other.

There can be no doubt that the "little Paradise," which gave the name thus traditionally preserved, was the Paradise which Josephus says Herod the Great formed around the newly-built fortress tomb, where the Edomite king was afterwards buried.

This Paradise of Herod was but a revival by him of the Royal Paradise belonging to the Great Solomon, whom it was his constant ambition to rival and to outdo in his kingdom, his magnificence and his buildings, including the Temple on Jericho—the palace on Zion and the country retreat here in the loveliest vale of Judah's royal inheritance.

The name Etham, which the valley formerly had from the city above, had in all probability been superseded after the days of Solomon by that of "Paradise," and the transition to that of Hortus = Urtas is not difficult to understand.

But still this gives no clue to the name of Emmaus having belonged to Urtas—although Urtas was clearly the only place where baths could have been maintained, and although Urtas was at the distance which Josephus gives as that of an Emmaus existing in his time.

We now turned our attention to what Josephus says about this Emmaus. It is not much, yet he alludes to three particulars in which his Emmæus agrees with that of St. Luke's Gospel.

1. The name.
2. The distance—60 furlongs.
3. It was a place, or village,

Χωριον, and therefore not the fortified city Emmaus-Nicopolis on the plain. But there is more than this to be got out of the notice of Josephus.

The position of Emmaus is indicated, and it is described as having been chosen for a Roman settlement of military colonists, 800 strong.

Jerusalem had fallen. Vespasian and Titus had returned to Rome. Lucilius Bassus was Legate in Judæa.

The regular army had already been sent into other countries, excepting the 10th Legion, and some companies of horse and foot. The commander had attacked that citadel, which was in Herodium, Jebel Furaidis in the Urtas valley, and having taken it, he reduced Macherus, east of Jordan, which was then the most important fortress left in Jewish hands.

That taken, there remained but one stronghold, that of Masada, on the western cliffs, a few hours from Herodium on the way towards it (*see* Josephus, "Ant.," xiv, 13, 9).

Masada was seemingly impregnable, and it was in the hands of a powerful and desperate body of infuriate Jews, whom the Romans were resolved to subdue.

It was about this time that Cæsar had ordered the lands of Judæa to be put up for sale, *all but one place*, which he "ordered to be reserved" for 800 men, whom he had dismissed from his army—which he gave them for habitation—it is called Emmaus, and is distant from Jersusalem three-score furlongs." ("Wars," vii, 6, 6.)

This place then must have combined advantages for colonial settlement with those of a central position among the mountain fastnesses, whence the Arabian and other tribes might be held in check, as well as the Jewish garrison at Musada.

What place so likely to attract the sagacious Romans as Urtas, with its copious supply of water from perennial springs, its rich soil, its admirable military position among the mountains with regard to Jerusalem, and to all the eastern and southern tribes—in the same valley as the Herodium (but just captured), and so near Musada as to prevent any hostile movement on part of the Jews in that fortress.

The Imperial Emmaus colony may well have been posted at Urtas—and the name Hirtus may possibly date from the occupation by these Roman soldiers, who would not easily abandon so fertile a spot when once they had it in possession—and after the Roman troops were withdrawn, the Latin speaking people at Bethlehem would naturally preserve the Latin name.

The present Fellaheen, who are so tenacious in the preservation of ancient Shemitic names, could give us no other name than Urtas, which has been used by them from time immemorial, but which has no meaning in their tongue. This fact alone points to the conclusion that this race did not directly succeed to the original Jewish owners, but that a Latin speaking colony had intervened for at least a temporary settlement.

Otherwise the ancient name would be still in use, as in so many hundreds of places where the Fellaheen have preserved them.

Nablous (Neapolis) for Shechem, and Sebastieh (Sebaste) for Samaria, are instances of Greek names which have in this manner supplanted older Hebrew names.

Urtas for Hirtus would be one more instance of similar change where an occupation of foreigners came between the ancient and the present possessors.

Not only are the position and character of the Urtas valley suitable for a Roman settlement, but in the village there are actual remains of a strong stone building, possibly a small fort. The character of the masonry points to the Roman age. Further down the valley there are remains of similar style, and massive masonry which the Fellaheen call "the Mills."

There is an instance at Kotonieh (the first station on the road to Jaffa, west of Jerusalem) of a Roman fort built like this in a commanding situation in a valley instead of on a height.

Kotonieh is acknowledged to have derived its present name from a Roman colonia, or military colony stationed there. Though also a watered valley, the position is not likely to have been the one chosen by the Roman Emperor for his Emmaus settlement, for it would have been altogether useless on this western side as a check on the eastern fortress of Musada, or on the mountain district in general, being too much off the upper plateau of highlands.

Having so far identified the Urtas valley with the Etham where Solomon had his gardens and paradise, and Herod the Great his paradise around the Herodium, and also as a suitable place for the Emmaus military colony, the *name* Emmaus still remained a difficulty.

Why should the Etham of early Jewish history have become Emmaus in Roman times?

And where were "the baths," which alone could have justified the name Emmaus?

The following circumstances led to the recovery of these missing links: the name Hammâm, which in Syro-Arabic represents the Greek Emmaus, and the ruins of sumptuous Roman baths.

In 1847 the rich soil and streams of living water in the Urtas valley, then deserted and desolate, had attracted the attention of John Meshullam, a British subject of Jewish birth. He sought and obtained the protection and assistance of the then British Consul (my husband), Mr. Finn, in establishing himself there upon lands leased from the Fellah proprietors. By the year 1856, a considerable part of the valley had been planted and restored to a condition of fertility and beauty. In that year I joined him in taking under cultivation a fresh tract, further down the valley.

Gardens and orchards, in fact "paradises," irrigated by streams from the fountain head, were once more formed in the valley-bed as of old.

At one part, however, progress was arrested, the ground could not be cleared as elsewhere, for planting; it was fully occupied beneath the surface by remains of buildings hitherto concealed by about 20 inches of soil, evidently washed down from above in course of ages. We had noticed before that when the stream of water reached this spot, it used to disappear as if into a chamber of some kind.

Early in 1857, in digging for the foundations of a retaining wall for a garden plot, we once more came upon these remains, and found excellent hewn stone lying loose from some former building, also a fragment of cornice, pieces of a stone door with a place for the bolt, a few copper coins (one of Constantine, the rest Cufic), and a small bit of glass mosaic.

What was our delight when, as we stood there watching the Fellah workmen, we caught from their lips the word "Hammâm," "baths."

"Hammâm!" we cried, "where is the Hammâm?" "Oh!" replied one standing by, "the Fellaheen here *always* call this spot the place of the Hammâm, and yon rock jutting out into the path they call *Leeyet al Hammâm*, "the promontory of the baths."

At last, then, here was the missing link, the name *Emmaus*. But how make certain that the name had real value. Where were the baths?

Several years passed before funds for making excavations were forthcoming.

But one thing became clearer each succeeding year, that in no other place within 60 furlongs of Jerusalem was water sufficient for maintaining baths to be found excepting at Urtas only.

At last, in 1861, Mr. Cyril Graham, whose discoveries east of Jordan had already cast so much light upon the literal accuracy of Holy Scripture, joined us in commencing diggings at the so-called Hammâm in Urtas.

Just before we began, there were dug up in a field adjoining that spot, two Corinthian capitals of extremely pure style, and a fragment of cornice, all of native limestone. This quickened our zeal. We set to work, and the very first thing that came to light, only a few feet below the surface, was *a bath!* lined with purest white marble in perfect preservation, 4 feet long by 3 feet 7 inches wide, and 3 feet 9 inches deep, having in it a step or seat for convenience of the bather.

The marble is foreign, apparently from Greece.

In this bath were found two bronze strigiles, or bath scrapers similar

to those found in the baths at Pompei. Also large quantities of coloured and gilt glass mosaics like those of Pompei, and those which ornament the dome of the rock on Moriah, the Churches of the Holy Sepulchre, and of the Nativity, and St. Sophia at Constantinople.

Next to this bath, we found another bath or tank, 23 feet by 18 feet, and 4½ feet deep. The cement still remains in considerable quantity on the floor and sides. We then found, at a higher level, above the marble bath, and communicating with it, another tank, 4 feet 4 inches long by 4 feet wide, and 4 feet deep.

In all of these were found glass mosaics ; in the largest there also lay a small fragment of a column of blue and white marble ; many pieces of thick greenish panes of glass, evidently window panes of the bath ; much white marble pavement ; one Jewish copper coin considerably worn ; several Cufic coins, and the ornamental hasp of a brass lock.

Higher again than the small tank, and communicating with it by a cylindrical bore through the massive stone wall, we next found a large pool (perhaps swimming bath), 51 feet wide, that is 30 cubits of 21 inches, by 8 feet deep. The length he could not then ascertain. It was quite filled with mould washed down in course of ages from the higher ground.

In this pool we found still more proofs of the costly and magnificent character of these baths. Buried in the earth, there lay the shaft of a column, 8 feet 8 inches long, and 3 feet 11 inches in circumference, also of pure white foreign marble ; and not far off three marble capitals of peculiar style, very richly and beautifully carved in a species of palm-leaf pattern, somewhat like Corinthian, and reminding us of the monolith at the Huldah Gate of the Temple on Moriah. The roof had doubtless been supported on pillars as in the baths of Caracalla at Rome.

Here were also fragments of very thin glass vessels and of ancient pottery ; bits of Roman tiles ; two little metal implements, apparently ear-picks ; a piece of a stylus of unknown material ; and fragments of marble pavement grooved so as to be bound together with metal clamps, which were still in some of the pieces.

There were a piece of an iron hinge, a rusty sickle, and a small bit of glass shaped like a solid trumpet (similar, as some one told us, to metal ones found at Pompei), also a fragment of glass, which bears on it marks of the casting process, such as one sees on glass cast nowadays. Cast glass has also been found in the baths at Pompei. The last, and perhaps the most interesting of the miscellaneous relics dug up, were small triangular pieces of black bituminous stone which had evidently been used in mosaic pavement.

This stone, found near the Dead Sea, is now used by the Bethlehemites for small ornamental cups, vases, &c. But Josephus tells us of the use to which it was put in the days of King Solomon, as pavement on the road which he laid for chariots from this very place, Etham.

"Now Solomon had divine sagacity in all things, and was very diligent and studious to have all things done after an elegant manner, so he did

not neglect the care of the ways, but he laid a causeway of *black stone* along the road that led to Jerusalem, which was the royal city—both to render them easy for travellers, and to manifest the grandeur of his riches and government" ("Ant.," viii, 7, 3, 4).

The marble lined bath when laid open to view at once struck our Jewish friends as similar in arrangement to the Mikoah, or bath used for ceremonial ablutions at the synagogue. And they argued that this was proof of the whole being the work of their great King Solomon. It is of course possible that Solomon may have added baths to the luxuries of his country paradise—though not of the Roman style.

But the foreign marbles, the style of the capitals, the glass and the pottery, led us rather to ascribe them to Herod the Great, whose extraordinary love of luxury is well known, and who would gladly adopt the custom which had newly come in with the reign of Augustus Cæsar of establishing magnificent Royal Thermæ. There was an unmistakable resemblance here to Roman baths. And Herod would naturally mingle Jewish arrangements with those which bespoke his Roman tastes. The only other sovereign by whom they might have been arranged was Constantine. But his residence at Jerusalem was too short for such an undertaking, and the baths must have existed before St. Luke and Josephus wrote about Emmaus, near Jerusalem.

Here, then, beyond all cavil or doubt, we had brought to light Emmaus, the Hammâm, the baths, at 60 furlongs from Jerusalem.

And it seems to me that while the accuracy of St. Luke and of Josephus are vindicated, we may easily account for the fact that Hamath, the purely Hebrew form of Emmaus, has not been recovered as attached to this spot. There are no natural *hot springs* here to deserve the name of Hamath. These are artificial Roman baths, just such as the proud luxurious Herod in his emulation of Cæsar, no less than of Solomon, would erect here at his little paradise and near his fortress at Herodium.[1] The Greek name Emmaus would naturally be used in those Greek speaking days for the little village, now that the ancient Etham higher up was no longer a strong city. As Emmaus only, not as Hamath, could it have been known to the writers of our Saviour's days. It was as such the creation of Herod. The mention of this place by this name by two writers of the Herodian period, St. Luke and Josephus, is one of those undesigned coincidences so invaluable in evidence.

This Emmaus was Emmaus *only* at the particular period when they were writing.

[1] Thermæ—hot-springs, meant properly warm springs or baths of warm water—but came to be applied to those magnificent edifices which grew up under the Empire in place of the simple balnea of the Republic. . . . . Writers, however, use these terms without distinction ; thus the baths erected by Claudius Etruscus, the freed man of the Emperor Claudian, are styled by Statius balnea, and by Martial Etrusci thermulæ.—"Dict. Greek and Roman Antiquities," Art. *Balneæ.*

And when the splendid baths were laid in ruins the marble columns which had supported the roof, the capitals, the mosaics, and all the rest were mingled in general ruin, the baths lay buried under the ruins; Emmaus disappeared and became known as the Hortus of King Herod (as of Solomon before him) to the Latin speaking soldier colonists of Titus who occupied the ground, aided perhaps by native Fellaheen. These latter in their turn swarmed over the land and took possession of it as Urtas, which it has remained till now.

All Jewish inhabitants must have disappeared and made way for the Roman soldiery, who would be at no pains to preserve the Hebrew name, otherwise it must have been handed on and preserved by the Fellaheen, whose language is so similar to Hebrew.

The marvellous fact remains that though the name of the village was lost, though the ruined baths were buried in the soil, these ignorant peasants had preserved to us in their unerring and imperishable tradition at the place, and the promontory of the Hammâm, the clue to the discovery of the long lost Emmaus, here at 60 furlongs from Jerusalem, with its baths of royal magnificence.

Another consideration of deep interest suggests itself in connection with the sacred history of this Emmaus. King Solomon would not have appropriated this valley for his country retreat, unless it had been his by inheritance from his father David, and his grandfather Jesse, the Bethlehemite. He could not otherwise have obtained it, for the law of Moses forbade the alienation of land from any family by purchase or sale (Leviticus xxv, 23–31; Numbers xxxvi, 7–9; 1 Kings xxi, 3; Ezekiel xlvi, 18).

Now if the Urtas valley from Etham downwards was the family property of David's Royal House, it must also have been the legitimate inheritance of Him Who was the lineal descendant of David—and as such the rightful Heir to his possessions and to his throne—the acknowledged Son of David.

What an unexpected interest this gives to the simple narrative of St. Luke's Gospel, in which is accorded how on the day of His Resurrection the Lord joined the two disciples on their way to Emmaus. Cleophas himself as connected with the family of David may have also had some inherited part or share in the valley as well as in Bethlehem close by. Eusebius in the "Onomasticon" says that Cleophas *was a native of Emmaus.*

The invitation addressed by the disciples to our Lord was not that of mere strangers visiting the village.

How familiar must every object have been to these wayfarers—how well known every step of the road across the plain, now green with springing corn and bright with flowers, how pleasant every turn of the sweet retired road that leads winding from Rachel's sepulchre along the hill sides in full view of Bethlehem, to the sheltered valley.

The Edomite usurper of David's throne had appropriated to his own use this possession of David's family. Josephus tells us ('Wars," vii, 8, 4) that

" he feared the multitude of the Jews lest they should depose him and restore their former kings to the government." He had tried by slaughter of the Innocents to destroy Him that was born at Bethlehem King of the Jews. Where was the Great Herod on that Easter evening when the risen son of David visited Emmaus with His two disciples? No man feared the tyrant now—he was dead thirty years before, and lying buried in his fortress-tomb on the summit of Herodium which looks down upon Bethlehem, and upon the Urtas valley.

Here, then, in the quiet village of Emmaus, the first meal was shared—the first bread broken, and the blessing given by our Lord. When the disciples saw Who He was, and rose up to go to Jerusalem, it was for no weary journey of twenty miles up steep mountain passes, but for a delightful walk by familiar paths, and across the smooth plain that they hastened forward to the Holy City—to find the eleven, and those that were with them, still assembled after supper.

This little company was shut in isolated and anxious, "for fear of the Jews." What a different meal had theirs been from the feasts going on that night among the thousands of Israel who were keeping holiday in Jerusalem.

Some at least among the disciples had been disabled according to Mosaic law—" defiled by reason of a dead body," when assisting at their Master's burial, and in visiting His grave.

For them there would be no further share in festive social gatherings, in the grand temple services or the solemn benedictions of the High Priest. Their Passover had been abruptly closed in grief. Now suddenly sorrow and perplexities are ended. The two arrive with glad tidings, and while yet they are speaking, the Master appears with peace upon His lips, and confirmation of the joyful tidings. The lonely meal is timed with high festival by presence of the Divine Guest Who shares it with them. The testimony of the two is placed beyond doubt, for He repeats to the whole company the arguments from the Law of Moses, the Prophets, and the Psalms which had been the subject of discourse that afternoon on the way to Emmaus.

May we not say that we now know where that highly honoured village lay, and that the Emmaus 60 furlongs from Jerusalem has been identified with Urtas by the ruins of Herod's costly baths?

The site of the royal gardens is still marked by trees bearing fruit in their season, nourished by refreshing streams, the mountains still breathe the fragrance of aromatic plants, the vineyards yield clusters of rich grapes, and pure waters are still carried by the ancient aqueduct from the fountain head to Bethlehem, and even sometimes to the Temple Courts on Moriah.

But the highest and most sacred interest of all that cleaves to this valley, this royal heritage (reserved unsold by the Royal Emperor when he ordered all other Judæan lands to be put up for auction), is for ever bound up with our Lord's visit to Emmaus on the day of His Resurrection with His two disciples.